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ON THE SOLVENT POWERS OF SIMPLE SYRUP.

By Joseph Howland Bill, M. D., U. S. A.

For many and varied purposes, sugar has long been used in medicine. To the pharmaceutist it is of the greatest use, as is proved by the long array of officinal syrups, as well as the numerous preparations into which sugar enters as an excipient or corrigent. The chemist also uses sugar to protect from oxidation bodies easily oxidized. The physician uses sugar as a remedy in scrofulosis, as a soother of that tickling cough attending deficiency of mucus in the air passages, in the form of honey as a topical application in scarlatina anginosa, and also to protect burns, wounds, &c., from the action of the air, as well as to heal those wounds by inducing a local eutrophy of cell action. For if we admit that sugar is a general eutrophic in scrofulosis, modifying cell action just as ol. morrhuæ does, why not admit that it is capable of, and that it does produce, analogous changes in unhealthy solutions of continuity? We have so often seen the efficacy of sugar applied to wounds, when substances which merely excluded the air did no good, that we are persuaded that sugar is capable of local as well as general eutrophy.

We wish, however, in this paper to call attention, in the first place, to the specific solvent powers possessed by syrup as compared with water.

1. The writer had occasion, some time ago, to make the "lime syrup," used in Peligot's modification of Will and Varrentrap's method for the estimation of nitrogen. Seeing the strength and permanency of the solution so made, the writer at that time

made use of the preparation as a remedy in a case of acid dyspepsia with great resulting advantage. Since then he has seen it tried by others, by Dr. Mitchell, for instance, with success. Dr. Capitaine, of Paris, however, had made the same application before the writer had thought of it, although the first notice the writer saw of it was a note appended to the article Aqua Calcis in the U. S. Dispensatory. Dr. Capitaine also used it successfully. The writer, although being behind hand in his application, determined, at least, to investigate some of the properties, &c., of a solution of lime in syrup.

First.—To 'Syrupus,' U. S. P., two parts of water were added, and the syrup resulting was poured upon fresh unslaked lime in a bottle, and allowed to stand four summer months. No heat was applied. At the end of this time, the syrup being perfectly clear, a quantity was removed by a pipette. This syrup was sherry-colored, alkaline in reaction, calcareous in taste, and smelt slightly of metacetone. One fluid-ounce was carefully burnt in a crucible, and the ashes dissolved in dilute acid. The lime present precipitated by oxalate of ammonia, collected on a filter, washed, burnt and weighed as carbonate.

Crux + contents . . .	181.495
do. — do. . . .	153.005
Contents consisting of carbonate of lime	28.49

This would give about 20.5 of hydrate of lime in f.ʒi.

Second.—'Syrupus' was added to lime in a bottle, and allowed to stand three weeks. The syrup filtered off at the end of this time was strongly alkaline, calcareous in taste, dark sherry in color, and rather thick. Took f.ʒss. and burnt, conducting the process as in the first experiment.

Crux + contents	155.000
do. — do.	153.004
Contents consisting of carbonate of lime	1.996

This is nearly 2 grs. of carbonate in the half ounce, or nearly 3 grains of hydrate of lime in the ounce.

Third.—Boiled some lime with 'Syrupus,' filtered while hot, obtaining a syrup dark brown in color, very thick, smelling strongly of metacetone, slightly calcareous and alkaline. A

few days after took f.ʒss., burnt, and treated exactly as before, with this result:

Crux + contents	161.500
do. — do.	153.005
Contents	8.495

This gives 6.1 grains (nearly) of hydrate of lime in f.ʒss. or 13 in f.ʒj.

Fourth.—Four parts of sugar was added to one of 'Syrupus,' and, while boiling, unslaked lime added. The liquid became dark brown at once, frothed, gave off copious fumes of metacetone, and was found on cooling to be perfectly neutral. M. Beral, of Paris, asserts that, by having a sufficiently strong syrup, caustic solutions result. This fourth experiment of the writer is opposed to this statement.

The foregoing experiments show how much *lime* was present in the solutions, but they say nothing about the alkalinity present, how, as metacetonic acid is produced when sugar and lime are boiled together, part, at least, of the lime found in the above solutions may have existed as metacetonate, and consequently in a state rendering the preparation worthless. To determine the question which syrup is the most alkaline, volumetric experiments were made. An acid solution was prepared of the strength that

f.ʒj. Aqua Calcis neutralized				5 measures.
f.ʒj. of dilute lime syrup, 1 day old, neutralized				8 do.
f.ʒj. of the syrup of experiment			first	36 do.
f.ʒj.	do.	do.	second	40 do.
f.ʒj.	do.	do.	third	30 do.

From the above, it seems that the most alkaline syrup was that made from 'Syrupus' in the cold. On this account, then, this syrup should be preferred. But I found that a *strong* lime syrup acted in the cold exactly as weaker syrup did when heated, *i. e.*, was decomposed into metacetonic acid, so that on leaving number two for a few days exposed to evaporation, the syrup became very dark, thick and crystalline, and lost its alkalinity. Hence in practice syrup No. 1 is the best, and besides, it is quite as strong as can be swallowed. I append a formula. Take of Syrupus ℔j., water ℔ij., of unslaked lime a sufficient quantity.

Place all together in a bottle; shake frequently for a week; allow the lime to subside; and in three weeks the preparation is ready. Dose, a teaspoonful in a wine-glass of milk. This syrup is less bulky for exhibition, is more pleasant to the taste, keeps better, is far more powerful than Aqua Calcis, and we feel certain that any who have once used Syrupus Calcis will never go back to the old lime water.

The writer next tried the power of 'Syrupus' to dissolve arsenious acid. A sufficient quantity of this acid was boiled with 'Syrupus' for fifteen minutes, and the whole filtered. This syrup had an acid reaction, and a very unpleasant metallic taste. It was impossible to burn off the sugar, as, according to the results of Dr. J. K. Mitchell, arsenious acid is sublimed below 300° F. But arsenite of potash is not volatile, and accordingly the writer added a sufficient amount of caustic potash and of nitre to f.ʒvii. of syrup, and then burnt. The ashes were dissolved in dilute hydrochloric acid and precipitated with sulphuretted hydrogen. The precipitate collected on a weighed filter, dried and weighed.

Filter + contents	26.09
do. — do.	10.49
Contents consisting of ter-sulphuret of arsenic	16.60

This gives 13.6 in seven drachms, or about 15.54 grains of arsenious acid are dissolved by one ounce of 'Syrupus.' We propose the following formula for this preparation:

R. Acidi Arseniosi	grs. lii.
Lacmi	q. s.
Syrupus	Oj.

Digest the litmus and syrup together for a few days, add the arsenious acid, boil and strain. Dose, five to ten drops in a wine-glass of water. Among many of the profession arsenious acid is preferred to Fowler's solution (witness the so-called Liq. Arsenici Chloridi, Ph. Lond., which is nothing but arsenious dissolved in hydrochloric acid); with such, the above preparation will probably meet with favor.

The writer next examined the power of 'Syrupus' to dissolve Bismuthi Subnitras, but obtained no interesting results, although

freshly precipitated subnitrate is more or less soluble, about 2 grs. in the ounce of syrup dissolving.

Calomel was next tried, but it was found impossible to get rid of the syrup without losing the mercury.

Sulphur, phosphate of lime, sulphate of baryta, iodide and chloride of silver, carbonate of lead, camphor, and many other insoluble substances, but without any positive results. Chlorine, iodine and bromine were more soluble in syrup than in water, and the solutions were more permanent.

Carbonate and phosphate of iron were found insoluble.

The writer finding it impossible to prepare proto-carbonate of iron by the officinal process (vide Pill. Ferri Carb.) devised the following method, by which nearly pure proto-carbonate was made. Proto-sulphate of iron was first made by Bonsdorff's process. A distillatory receiver was then fitted with a funnel and the tubulure was tied over with a rag. The sulphate of iron hot was poured in, and then boiling solution of carbonate of soda. The precipitate was washed with hot *boiled* water, and as soon as the washings ceased to precipitate chloride barium, 'Syrupus' was added by the funnel, and the whole poured into a dish; it was pure carbonate of iron and ready for use. The process consumes about twenty minutes.

Thus far we have been treating of the solvent powers of syrup. We wish now to speak of a matter related to its solvent power.

We desire here to enunciate the general truth, and to promulgate it as a truth as yet unrecognized, viz: That many substances may be dissolved in syrup, which it would be impossible to dissolve in water, for the reason that the affinity of the water in the syrup for the dissolved body, or its solvent, is completely neutralized by the affinity of the water for the sugar of the syrup. In other words, we propose to antagonize the disposition of the water to unite with the dissolved body, or its solvent, by the superior disposition of the water to keep itself united with the sugar. For instance, it is impossible to swallow Tinctura Camphoræ. If you mix it with the water, this latter seizes upon the alcohol of the tincture, and the camphor is precipitated, and if you swallow this camphor mixture, more or less gastrodynia is sure to result. If, however, you mix the tincture with

'Syrupus,' the water now is prevented by its attraction for the sugar, from seizing upon the alcohol, and you have the composition of the tincture undisturbed and yet sufficiently dilute to be swallowed. Here we have an antagonism of forces between the affinity of the water for the sugar on the one hand, and that of water for alcohol on the other. So again in the chlorine, iodine or bromine syrups; owing to the affinity of the water for the sugar of the syrups, the former is not easily decomposed by the affinity which chlorine, bromine and iodine respectively have for its hydrogen element. If we admit that caustic lime is more soluble than hydrate of lime, we can explain the ready solubility of lime in sugar as compared with water. In Aqua Calcis the caustic lime is changed into hydrate by the excess of water, and this being insoluble, falls down. In syrupus calcis the caustic lime cannot take away the water of the syrup, and is consequently held dissolved. The inferior solubility of hydrate, as compared with caustic lime, also explains why, when water in excess is added to Syrupus Calcis, the lime is precipitated. Here the same quantity of sugar is present as before the water was added, but a hydrate of lime is formed by the excess of water, and this is precipitated. From a consideration of the truth which we have thus explained, we were able to infer the permanent solubility of many bodies in 'Syrupus' which are insoluble, permanently at least, in water.

The first substance which we will notice is tartar emetic. Wine of antimony is a good preparation, but owing to the poorness of the common wines and the expensiveness of the good ones, the preparation is generally unreliable. Now we have kept a solution of tartar emetic in 'Syrupus' for six months without change; the syrup contained one scruple to the ounce. How admirable a thing then will a Syrupus Antimonii prove, especially to country practitioners, who too often, on going to the antimonial wine bottle, find its contents spoiled. It may be made of the strength of ¼ gr. to the fluid drachm.

Having failed in effecting a solution of sub-nitrate of bismuth, it struck us that, upon this same principle, we might make a syrup of the tris-nitrate. The result proved our inference correct. When tris-nitrate of bismuth (made by simply dissolving the metal in nitric acid and allowing the solution to crystallize)

be added to boiling 'Syrupus,' a violent reaction ensues, the sugar is deprived of its water, sub-nitrate is formed, and, after a general effervescing and fuming, a solid mass, the consistency of lead plaster, results. But if crystals of tris-nitrate be added to cold 'Syrupus' they are dissolved in large quantities, a, at first, colorless solution resulting. This salt, when taken internally, in syrup, in six grain doses, acted as an excellent tonic, increasing the appetite to a wonderful degree and blackening the stools. Dr. Weir Mitchell has used this salt twice in cases of atonic dyspepsia, and with excellent results. We subjoin a formula which is to be used extemporaneously only:

R. Bismuthi tris-nitratis . . ʒiss.
Syrupus Zingib. vel.
Limonis vel Aurantii Corticis . f.ʒvi.
Misce sinê calore.

Dose, three teaspoonsful before meals. We have the most sanguine hopes from this preparation, and solicit a fair trial. Again, there is the anhydrous sublimed perchloride of iron, an infinitely better form for iron than the nauseous Tinct. Ferri Muriat. This anhydrous salt, when dissolved in 'Syrupus,' remains *anhydrous*, and is far more astringent, as well as far pleasanter for exhibition than the tincture. This administration of an *anhydrous* chloride of iron will no doubt be found of great service in cases of menorrhagia, some states of albuminaria, as a gargle, and even as a simple tonic. The tinctures of the various resins, turpentine, etc., etc., may be administered in 'Syrupus' far better than to dilute them with water. We have evidence enough, however, to call attention to the general proposition we have tried to explain, and we must content ourselves with this.

We wish it to be noticed that cane sugar has been used in our experiments. It might be of use to ascertain whether cane or grape sugar possessed the greater solvent power, and thus show whether syrup or honey is the better adapted to the wants of the pharmaceutist.

In this paper we have endeavored to point out—

1. Some specific solvent powers of syrup.

2. That many bodies may be dissolved in syrup which could not be dissolved in water, owing to the latter forming some chemical salt with the former; but that by opposing the physi-

cal affinity of the water for the sugar to this latter chemical affinity an equilibrium of forces or attractions result, and the stability of the compound is preserved.

Philadelphia, April, 1858.

ON CAPSICUM ANNUUM.

By F. Victor Heydenreich.

(Presented to the Philadelphia College of Pharmacy, March, 1858.)

From the analysis of Buchholtz and Braconnot, as quoted by Pereira, the active principle of capsicum seems to have been considered by the first of these chemists as a soft, acrid resin, and by the latter, as an acrid oil; it was obtained by making an alcoholic extract of capsicum, exhausting this by ether, and evaporating. But, as thus obtained, capsicin still contains some inert matter precipitable by subacetate of lead, as was noticed by Professor Procter, who, by this treatment, obtained a product much more pungent than the original capsicin. From experiments made by Mr. H. B. Taylor, and published in the fourth number of the "American Journal of Pharmacy" for 1857, it would appear that there exists in capsicum a crystalline substance, having all the properties of capsicum. The process by which this was obtained was by making an ethereal extract of capsicum, treating this with alcohol, separating the inert matter by subacetate of lead, freeing the solution from lead by hydrosulphuric acid, filtering and boiling it to remove the acetic acid and the excess of hydrosulphuric acid, when on evaporation the capsicin was obtained in a crystalline state. With a view of isolating this crystalline capsicin, this process was carefully followed and repeated; but all my attempts were unsuccessful; the only product being an oily substance of a deep amber color. This was dissolved in alcohol, treated with animal charcoal, and allowed to evaporate spontaneously. The result was an oil of a light lemon-yellow color; rather more viscid than olive oil, lighter than water, and having the odor and intensely hot taste of capsicum, but not showing the least disposition to crystallize. At a temperature near 0° it is almost solid, when heated, it becomes very fluid, and if the heat be increased, it gives off very irritating fumes. It is very soluble in ether, chloroform and alcohol, sp.

gr. 0.809, and in eighty parts of alcohol, sp. gr. 0.835. It is very slightly soluble in acetic acid and water, though boiling water takes up a perceptible portion of it; it mixes readily with fixed and volatile oils; when mixed with solution of potassa or ammonia, it forms a compound resembling soap, from which it is liberated on the addition of an acid. Sulphuric acid changes it to a dark brown color, while nitric acid does not affect it.

Having been unsuccessful in my attempts to obtain the crystalline substance of Mr. Taylor, some experiments were undertaken with a view of ascertaining the composition of this drug, and the principles to which it owes its properties.

A tincture of capsicum was prepared by percolation, using alcohol, sp. gr. 0.809 as the menstruum. This tincture was slowly evaporated to a small bulk, and allowed to cool. On examining it after cooling, it was found to have separated into three layers: the first consisted of a dark brown substance, and had settled in the bottom of the dish; the second was a reddish brown oil; and the third was the alcoholic tincture, holding in solution the more soluble principles of capsicum. These last two were separated, and the residue washed with a little ether. When so treated, the dark substance was found to have the consistence of an extract; to be very soluble in water, not readily in strong alcohol, but more so in dilute alcohol; a solution of it is precipitated by the acetate and subacetate of lead, and by the nitrate of mercury, but is not coagulated by a solution of sesquichloride of iron; from these characters it may be regarded as extractive with a peculiar gum.

The reddish brown oil is lighter than water, has the consistence of olive oil, and the odor and pungent taste of capsicum. When heated, it becomes very fluid, and finally emits very acrid fumes; it is sparingly soluble in acetic acid and water, more so in boiling water, to which it communicates a marked taste. It is soluble in about 120 parts of alcohol, sp. gr. 0.809, very soluble in ether, chloroform and oil of turpentine; it mixes readily with fixed oils; with solution of potassa it forms compounds, which are decomposed by acids; by sulphuric acid it is blackened, and nitric acid changes it first to a green, and finally to a dark brown color.

The alcoholic tincture was then evaporated to an extract, and

this, treated with ether, which dissolved all the active portion of it, leaving behind a gummy substance which behaved with reagents, like the extractive already described. The ethereal solution was evaporated, the resulting extract dissolved in alcohol, sp. gr. 0.809, and this tincture then treated with an alcoholic solution of subacetate of lead till a precipitate was no longer produced. This was filtered, and to the clear liquid thus obtained was added a very weak solution of sulphuric acid in alcohol, to remove the lead from the solution as a sulphate. By this treatment the remaining active principle was obtained in solution mixed with a little acetic acid, which was removed by boiling the solution. After decolorizing by animal charcoal, and evaporating, an oily liquid was obtained which was found to be identical, both in its general behaviour and in its solubilities with the product obtained by the process of Mr. Taylor. The precipitate produced by subacetate of lead, was next introduced into a bottle with some acetic acid and some ether. The ethereal liquid was poured off, and on evaporation left a fatty substance, soft to the touch, melting readily when heated, soluble in alcohol, ether, chloroform and oil of turpentine; with solution of potassa or ammonia it forms compounds resembling soaps.

After exhausting capsicum by means of alcohol, the dregs were percolated with some ether, and the tincture evaporated. The result of this treatment was a very small portion of the reddish brown oil previously described. With a view of ascertaining the presence of wax, the dregs were digested with some oil of turpentine, but on evaporation nothing was left, showing that wax is not present in capsicum.

The dregs left after this treatment were dried, and a cold infusion made of a portion of them. The filtered liquid thus obtained was of a dark brown color, and was found to coagulate on boiling, and to give a precipitate with a solution of bichloride of mercury, thus showing the presence of albumen. To a portion of the infusion some alcohol was added, when a gelatinous substance separated. This was collected on a filter and washed with a little alcohol; on drying it formed into translucent masses, which, when dissolved in hot water, yielded a consistent jelly on cooling, thus showing the presence of pectin. After the separation of the pectin, the solution was concentrated and found to

give, with acetate of lead a slight precipitate; with subacetate of lead, a very copious one; nitrate of mercury also produced a precipitate, and a solution of sesquichloride of iron was found to coagulate it; indicating the presence of a peculiar gum, precipitable by neutral acetate of lead and not by alcohol. A portion of the dregs was boiled with water, and the filtered solution on cooling gave a blue color with a solution of iodine, showing the presence of starch.

A fresh portion of capsicum was mixed with some water and subjected to distillation. The distillate had but a slight taste of capsicum, and a disagreeable and empyreumatic odor, entirely different from that of the fruit; thus showing that capsicum does not contain any volatile oil proper. The two acrid oils were next distilled separately with some water; the distillates had but a slight taste, and an odor recalling that of the distilled water of capsicum, though not as strong. From this, it appears that the odorous principle of capsicum cannot be obtained by distillation, and that it resides in its active principles.

Analysis of the ashes.—Some capsicum was next ignited, and the resulting ashes repeatedly washed with boiling water. To a portion of the filtered solution was added a solution of tartaric acid in excess, when an abundant precipitate was formed, which was entirely soluble in boiling water, from which it separated on cooling in crystalline plates.

Another portion was evaporated to dryness, and then mixed with a little alcohol and ignited; this gave a violet tint to the flame, thus indicating the presence of potassa.

To another portion of the solution was added a solution of oxalic acid and a few drops of solution of ammonia; this produced a decided opacity in the liquid, which was not affected by acetic acid, though readily dispelled by nitric acid, showing the presence of a small portion of lime.

To another portion was added some solution of nitrate of silver; this produced an abundant precipitate of a yellowish white color, entirely soluble in solution of ammonia, but partially only in nitric acid, thus indicating the presence of phosphoric acid and chlorine.

To another portion was added some solution of chloride of barium; this produced a copious white precipitate, which was

mostly soluble in nitric acid, but leaving quite a perceptible precipitate which refused to dissolve; thus showing the presence of phosphoric acid and a small portion of sulphuric acid.

Some of the solution was evaporated to dryness, and on the addition of an acid, a considerable quantity of carbonic acid was given off.

The insoluble portion of the ashes was next treated with water, acidulated with hydrochloric acid. On the addition of this acid, a considerable quantity of carbonic acid was set free. A portion of the solution with a solution of ferrocyanide of potassium gave a deep blue precipitate, showing the presence of iron.

To another portion was added some solution of potassa in excess, and the insoluble portion collected on a filter. The filtrate was then neutralized with a few drops of hydrochloric acid and a solution of ammonia added in excess, when a gelatinous precipitate of alumina was obtained. The insoluble portion left on the filter was dissolved in a little dilute nitric acid, and to this, some solution of phosphate of soda and a few drops of solution of ammonia were added, when a crystalline precipitate of the double phosphate of ammonia and magnesia was formed. With a solution of oxalic acid and a few drops of solution of ammonia, some lime was detected in the solution. With a solution of chloride of barium, an insoluble precipitate of sulphate of baryta was also obtained. The insoluble portion left after the treatment by hydrochloric acid, was boiled with a concentrated solution of potassa, and this, neutralized by some hydrochloric acid, but no silica, was precipitated by these means. The remaining insoluble matter consisted almost entirely of carbon.

The organic constituents of capsicum from these experiments, appear to be; extractive with gum, a reddish brown oil, a yellowish-brown oil or soft resin, a peculiar fatty substance, albumen, pectin, a peculiar gum, starch and coloring matter. The ashes contain carbonate and phosphate of potassa, chloride of potassium, sulphate and carbonate of lime, sesquioxide of iron, alumina and magnesia.

The conclusions which I draw from these experiments, are—First, that capsicum owes its properties to two oily substances, which differ mainly from each other by their fluidity, by their color, and their solubility in alcohol, and neither of which are

crystallizable at common temperatures; secondly—that the capsicin of Buchholtz and Braconnot, contains both of these substances in combination with an inert fatty substance; and thirdly—that the substance obtained by Professor Procter, from their capsicin, by precipitating the fatty matter, is the true capsicin, containing both of the oily substances, and being, therefore, the most concentrated form, in which the properties of capsicum can be obtained.

ON PODOPHYLLIN:

By JOHN W. CADBURY.

(Presented to the Philadelphia College of Pharmacy, March, 1858.)

The rhizoma of the May-apple, [Podophyllum peltatum] a plant growing wild, in great abundance, in all sections of the United States, where a shady wood with a damp soil can be found, has for a long time been known to possess very decided medicinal virtue. The framers of the Pharmacopœia have given it a place among the officinal drugs, and have also made an extract officinal showing the esteem in which it has been held. But in the opinion of many, the podophyllum has not received that consideration which its efficient remedial powers would seem to demand.

Recently, however, the attention of scientific men has been more particularly called to this drug, as the idea has been entertained that its resin might take the place of the scammony in the Compound Extract of Colocynth, and that an extract of the root could supersede the use of the Extract of Jalap, in the Compound Cathartic Pill. Some advantages would accrue from such a substitution, especially in the case of the scammony; since, owing to the many adulterations to which it is subject, preparations containing it must necessarily be effected to a certain extent. The cost of the preparation would also be very materially diminished.

This subject is one of those which, at the late annual meeting of the American Pharmaceutical Association, was proposed for solution; since there is a possibility that the podophyllum alone may not be able to represent to the full extent the action on the system, caused by the combination of the two drugs, scammony and jalap. Previous investigations into the composi-

tion of the root of the mandrake have proved that it contains vegetable albumen, gum, gallic acid, starch, a fixed and a volatile oil, and two resins; one soluble in both alcohol and ether, the other in the former only.

Among these several constituents, the two resins alone appear to possess any purgative power, and whether to both of these, or to but one, the peculiar active principle should be ascribed, has not, as yet, been determined.

To isolate these resins, to ascertain this fact, the so-called podophyllin was treated; since it is known to contain them, associated with some coloring matter.

This podophyllin represents the root in a very concentrated form, producing the cathartic effect to a degree not to be surpassed by any other preparation which can be made from it.

To prepare it, a portion of the finely bruised root was exhausted of its bitterness by alcohol, of the specific gravity of .835: the tincture thus obtained was evaporated, by means of a water bath, to the consistence of a very thin syrup, and while hot, added to about three times its bulk of water, with constant agitation, till the whole appeared to be precipitated. By standing, this was deposited in the form of a yellowish powder, and being separated by means of a linen filter, was thoroughly washed upon it, and placed upon bibulous paper and dried, at a temperature of about 90° F.

The product as thus obtained, resembled the commercial article in all respects, except, perhaps, a slight difference in color; it being rendered dark, if a higher heat than that named be employed. It is freely soluble in alcohol, and partially so in ether, the latter menstruum taking up by far the greater amount, as one hundred grains yielded by treatment with it seventy-seven grains of soluble matter. A solution is effected in water, by means of a caustic alkali, from which, however, it is precipitable by the addition of an acid: even a weak one will answer the purpose.

If a very dilute solution of the alkalies be employed, it is not rendered soluble; it appears to form a saponaceous compound with one portion, a residue remaining undissolved. Water alone, either hot or cold, did not dissolve any, nor do the dilute acids or oil of turpentine hold it in solution.

It was extremely bitter to the taste, and very permanent. In the dose of one quarter of a grain, it operated as a brisk purge, and in double that quantity, it acted as a decided cathartic, attended with nausea and some distress.

A portion of podophyllin was treated with concentrated sulphuric ether, the whole thrown on a filter and thoroughly washed by that menstruum—the residue presented a black resinoid appearance, and was dissolved in alcohol, and boiled with purified animal charcoal till deprived of color; by evaporation it was obtained, at one time, in light feathery scales, but at another, in the form of a granular powder. This is the resin of podophyllum, corresponding to the officinal resin of jalap, from which, however, it materially differs, being even less active than the article from which it was procured, as it was taken, to the amount of one grain, without producing the slightest effect. There is another point in which it is dissimilar to those resins with which it has usually been classed, namely, a solution of it in caustic potassa, in which it is freely soluble, was precipitated by an acid, the same being the case when ammonia was the solvent. It was also thrown out of solution in alcohol, on the addition of caustic potassa, but was re-dissolved by excess of alkali.

Acetic and sulphuric acids, by the aid of heat and nitric acid in the cold, also dissolved it.

It exhibited, with test paper, no coloration, although by some, thought to possess acid properties.

Another portion of podophyllin was treated with a weak solution of carbonate of soda for forty-eight hours. At the end of that time it was thrown upon a filter, and water passed through, till all traces of the alkali were lost; the residue was dried, and found to be identical with the foregoing resin, as it was insoluble in ether, and freely soluble in alcohol, and with reagents exhibited the same results. It also did not produce any effect when taken internally, in the dose of one grain.

The other resin separated from the podophyllin by means of ether, and obtained from it by spontaneous evaporation, presented a greenish resinous aspect, very brittle when dry, and seemed to possess the odor of the root without its extreme bitterness. Like the first, its solution in an alkali was precipitated by the addition of an acid, but it required heating to the boiling

point to effect this solution. It was active in the dose of one quarter of a grain, producing an effect like the same amount of the podophyllin; than which it does not appear to be more powerful.

Though treated repeatedly, with purified animal charcoal and boiling alcohol, it was found impossible to free it of color.

A white principle, however, was obtained from it by treatment with boiling acetic acid, which, on cooling, deposited a yellowish powder, which, on purifying, was obtained nearly colorless; this constituted nearly ten per cent of the quantity operated upon, but in double the dose failed to produce any effect.

Another inert and colorless principle was also procured by the action of boiling distilled water, to which it imparted a milkiness. It was separated by agitation with ether.

It was thought that there might exist in the podophyllin, a volatile principle, as it was known that exposure to the air, and a high heat, rendered it less active. To ascertain this point, a portion was distilled in contact with potassa, but the distillate exhibited no phenomena by which the presence of such a principle could be inferred, and internally, in a large dose it produced no effect. The residue, after the operation, was tested by an acid, which caused a precipitate, as in the case of common solution.

Various attempts were made to obtain a crystallizable principle, but unattended with any success.

From the foregoing, it may, with safety, be concluded that the active principle of the May-apple root exists in a resinous substance, soluble in ether and alcohol, and present to the amount of at least seventy-five per cent in the commercial podophyllin prepared from the said plant, and that it may be employed with advantage, where the necessity, either of a mild purgative remedy, or of a harsher cathartic, is indicated.

ON SOME PREPARATIONS OF WILD CHERRY BARK (CERASUS SEROTINA.]

By Francis A. Figueroa.

(Extracted from an Inaugural Essay.)

Syrup of Wild Cherry Bark. (No. 1.)—Four ounces (Troy) of ground wild cherry bark, was treated by displacement, first moistening the bark with two ounces of Price's

glycerin and sufficient cold water. This mixture was allowed to macerate for forty-eight hours and then displaced to obtain ten fluid ounces of infusion, which is converted into a syrup with twelve ounces of sugar.

This syrup is stronger than the officinal, a fluid ounce representing two drachms of the bark.

Formula No. 2.—This formula is like the preceding except that the sugar is diminished to nine ounces in the pint.

Formula No. 3.—This syrup contains but six ounces of sugar and two fluid ounces of glycerin to the pint, being but three drachms of sugar to the fluid ounce of syrup.

The author states that all these preparations kept perfectly well from August to December, the period of rendering his thesis, and he believes they offer, especially the last, a means of employing wild cherry bark in an agreeable form, without embarrassing the digestive function with the large proportion of sugar contained in the officinal syrup. The author believes that the glycerin acts by its solvent power, as well as by its antiseptic preservative quality, and possibly may be useful therapeutically.

Fluid extract of Wild Cherry Bark.—Eight ounces of ground wild cherry bark was treated with two fluid ounces of glycerin and sufficient water. After standing forty-eight hours the mixture was carefully displaced until thirteen fluid ounces of concentrated infusion had passed. Six ounces of white sugar was dissolved in this infusion, to form a pint of fluid extract. This preparation also kept during the period mentioned.

Tincture of Wild Cherry Bark.—The author after various experiments with wine as a menstruum for this bark, arrives at the opinion that a very dilute alcohol (1 of alcohol to 7 of water) is preferable to wine. He directs two ounces of the powdered bark to be displaced with such a menstruum until a pint is obtained. He does not consider this preparation equal to either the syrup or fluid-extract.

The author likewise proposes a solid extract, formed by a union of alcoholic and watery extracts prepared separately; but such an extract has no advantages over the simple alcoholic extract already suggested (Amer. Jour. Pharm. vol. iv. 3d ser. p. 108,) as water will not extract the principle that decomposes the amygdalin of wild cherry bark.

ON THE STRENGTH OF DILUTED ACETIC ACID.

By John M. Maisch.

The diluted acetic acid enters into a number of pharmaceutical preparations, particularly such as are intended for internal use, as syrups, oxymels, acetate of ammonia, and various others; it is, therefore, of some importance to obtain it always of a certain strength, though in the dilute state in which it is given, some variation may in many cases be of little or no consequence. The questions to be answered consequently are: How strong is this acid to be? Which of the properties required by our Pharmacopœia is indicative of its intended strength? And which is the proportion of the acetic acid and distilled water, in order to obtain the desired product?

The Pharmacopœia requires the dilute acetic acid to have a specific gravity of 1.004, which, according to Mohr's tables, indicates 3 per cent. of the monohydrated acetic acid HO, $C_4 H_3 O_3$; the weight of equivalent of this monohydrate is 60, that of bicarbonate of potassa HO, KO, $2CO_2$ 100.2, therefore 100 grains of this acid are sufficient to saturate $\frac{3 \times 100.2}{60} = 5.01$ gr. of that bicarbonate, while the Pharmacopœia requires 7.5 grs. to saturate 100 grs. of the dilute acid. But 7.5 grs. of the bicarbonate of potassa will saturate $\frac{60 \times 7.5}{100.2} = 4.5$ grs. of the monohydrated acid, or 100 grs. of an acid of 4.5 per cent., which shows a difference of 1.5 per cent. between the power of saturation and the strength as indicated by specific gravity.

This difference cannot be decided by the product obtained by the formula of the Pharmacopœia, which again furnishes an acid differing in strength from both. On mixing acetic acid with distilled water, a contraction invariably occurs, and the sp. grav- of the mixture is higher than it is calculated, from the proportion of the articles used; this difference, however, becomes more insignificant as the dilution increases.

The Dublin Pharmacopœia uses the same proportion as the U. S. P.; but it employs an acid of 1.044 spec. grav., or 33 pr. ct., and states the diluted acid to be 1.006. By calculation the sp. grav. is found to be $\frac{7+1.044}{8} = 1.0055$, (4 per. ct. acid of Mohr's table,) and the percentage $\frac{33 \times 1.044}{8.041} = 4.283$; by the contraction the

spec. grav. is slightly increased. The acid of the U. S. P. weighs 1.041, and shows its percentage of monohydrate = 31. The percentage of the mixture must therefore be $\frac{31 \times 1.041}{8.041} = 4.013$, while the spec. grav. is found to be $\frac{8.041}{8} = 1.0051$, which certainly cannot be much out of the way. In round numbers, therefore, the formula of the Pharmacopœia furnishes a preparation of *four per cent.* of HO, $C_4 H_3 O_3$, so that 100 grains of it must saturate $\frac{4 \times 100.2}{60} = 6.67$ gr. bicarbonate of potassa. If, on the other hand, a dilute acid is wanted, which shall not contain but three per cent. of the monohydrate, the proportion of the acid and water must be 1 : 9.75; for $\frac{31 \times 1.041}{10.791} = 2.99$ per cent., and $\frac{10.791}{10.75} = 1.0038$ spec. grav. The specific gravity of an acid of 3 per cent. is 1.004 according to Mohr.

A fluidounce of water has a weight of 455.694 grains; therefore a fluidounce of acetic acid of 1.041 spec. grav. equals the weight of 474.388 grs. Troy, and such an acid containing 31 per cent. HO, $C_4 H_3 O_3$, its fluidounce must contain 147.06 grs. of the monohydrate, which, by the formula of the Pharmacopœia, is divided among 8 fluidounces, each of which will contain $\frac{147.06}{8}$ = 18.38 grs. HO, $C_4 H_3 O_3$, which saturate 30.699 grains, HO, KO, $2CO_2$ and 55.30 grs. CaO, CO_2. If, however, the intended strength of the diluted acid was to be 3 per cent. the 147.06 grs. of the monohydrated acid would be divided among $10\frac{3}{4}$ fluidounces, thus leaving for 1 fluidounce but 13.68 grs. monohydrate, which are saturated by 22.86 grs. bicarbonate of potassa, or 11.41 grs. pure carbonate of lime.

For preparations where the dilute acetic acid acts merely as a preventive agent, this latter strength of 3 per cent. might probably be deemed sufficient; but for other preparations, where the acid is of medicinal importance, we ought to rely on the saturating power of the acid. To obtain one of 4.5 per cent. strength, which would saturate for every 100 grs. 7.5 grs. of bicarbonate of potassa, the proportions of a 31 per cent. and water must be 1 : 6.13; for $\frac{1.041 \times 31}{7.171} = 4.5$, and the specific gravity of this mixture would be $\frac{7.171}{7.13} = 1.0058$. These proportions are very nearly the 1:6; an acid mixed in these proportions contains $\frac{1.041 \times 31}{7.041} = 4.58$ per cent. HO, $C_4 H_3 O_3$, and its specific gravity

will be $\frac{7.041}{7}$ = 1.0059. And this is doubtless the strength intended by the Pharmacopœia; the mistake was made in ordering the acetic acid of 31 per cent. to be one-seventh of the water instead of *one-seventh of the mixture.* On page 20 of the U. S. Dispensatory, 11th edition, the strength of the dilute acetic acid is given as 3 per cent., on page 840 as 4.5 per cent. of the monohydrated acid; this latter, or rather a somewhat stronger acid, is obtained by the above proportions. The fluidounce of an acid of 1.006 weighs 455.6944 × 1.006 = 458.43 grs., which, if of 4.58 per cent., contain 20.97 grs. HO, $C_4 H_3 O_3$. The 147 grains of the monohydrate of one fluidounce of acetic acid spec. grav. 1.041 are distributed among 7 fluidounces of the mixture, thus giving to each 21 grs. of this monohydrate, which saturate $\frac{21 \times 100.2}{60}$ = 35.7 grains of bicarbonate of potassa, $\frac{21 \times 50}{60}$ = 17.5 grs. carbonate of lime, and $\frac{21 \times 17}{60}$ = 5.95 grs. dry ammonia, producing 21 + 5.95 = 26.95 grains dry ammonia. 100 grains of this dilute acid are sufficient to saturate $\frac{100 \times 21 \times 100.2}{458.43 \times 60}$ = 7.65 grs. of bicarbonate of potassa, and $\frac{100 \times 21 \times 50}{458.43 \times 60}$ = 3.81 grs. carbonate of lime. If the standard strength of the acid, therefore, is retained at 31 per cent., the directions of the Pharmacopœia ought to be:

> Take of acetic acid, one pint; distilled water, six pints.
> Mix them.
>
> Diluted acetic acid has the specific gravity 1.006, and 100 grains of it saturate 7.6 grains of crystallized bicarbonate of potassa.

Subsequently, on referring to Mr. Parrish's "Practical Pharmacy," I found on page 124 the statement, that "100 grs. of the officinal acetic acid will be accurately saturated by 60 grs. of crystallized bicarbonate of potassa." But 100 grs. of the standard acid contain 31 grs. of the monohydrate, which are saturated by $\frac{31 \times 100.2}{60}$ = 51.77 grs. of bicarbonate; an acid of the saturating power as stated by Mr. Parrish is therefore *above* the standard strength, for 60 grs. of bicarbonate of potassa are saturated by $\frac{60 \times 60}{100.2}$ = 35.928 grs. HO, $C_4 H_3 O_3$, that is by 100 grs. of an acid of 36 per cent., which, according to Mohr, has a specific gravity of 1.047. Such an acid, however, if diluted with seven volumes of water furnishes a dilute acid of $\frac{36 \times 1.047}{8.047}$ = 4.68 per cent.

Mr. Parrish is likewise of the opinion that the dilute acetic acid of the Pharmacopœia is to be of 4.5 per cent. strength. By a mixture of one part of strong acid to seven parts of water it may be obtained, if the strength of the officinal acetic acid is increased to 35 per cent., when its specific gravity will be 1.046; 100 grs. of this acid are saturated by $\frac{35 \times 100.2}{60} = 58.45$ grs. bicarbonate of potassa. One fluidounce of this weighs $455.6944 \times 1.045 = 476.2$ grs. which contain $\frac{476.2 \times 35}{100} = 166.67$ grs. of monohydrated acid; this divided among 8 fluidounces leaves for each 20.83 grs., which are saturated by 17.36 grs. of carbonate of lime, and 34.78 grs. of bicarbonate of potassa. By calculation the percentage of this acid is found $\frac{35 \times 1.046}{8.046} = 4.55$, and the specific gravity $\frac{8.046}{8} = 1.0058$; all these figures very closely agree with those calculated above.

It might therefore appear more advisable to order an *acetic acid of the specific gravity* 1.046; the direction for the dilute acid will then be:

Take of acetic acid, one pint; distilled water seven pints.
Mix them.

Diluted acetic acid has the specific gravity 1.006, and 100 grains of it saturate 7.6 grains of crystallized bicarbonate of potassa.

Philadelphia, May, 1858.

ON THE PRESERVATION OF DRUGS AGAINST INSECTS.

By John M. Maisch.

A number of drugs are subject to attacks by mites, bugs and other insects, to avert which, different remedies have been proposed. Besides the requisite effectualness, it is necessary that such remedies are not injurious in any way to the articles to be preserved, and that they are devoid of smell, or so volatile as not to leave any odor behind, after a reasonable exposure to the air. To meet with an article possessing these requisites, is often not an easy matter, particularly if the drug to be protected is in powder or has a delicate odor. Camphor may answer the purpose in many instances; but the objection in most cases will be its not being readily volatilizable on exposure to the air, owing

to its easy penetrativeness into the pores of organic substances by which its ultimate volatilization, without the employment of heat, is greatly impeded, and often rendered a matter of difficulty.

Orris root is one of those substances which are very often attacked by bugs, particularly the powder, and this liability increases with the dampness of the article. If powdered orris is thoroughly dried and put in well stopped bottles, so as to prevent its contact with the atmosphere as much as possible, it usually keeps well for a considerable time; but I have never found it to be attacked by bugs when a small quantity of sulphuric ether had been thrown into the bottle. I was led to the adoption of this precaution with orris root of rather suspicious inclination to mustiness and bugs, by having freed several samples of powdered orris from bugs after their having taken quarters therein, simply by mixing some ether with the powder and enclosing it in tight bottles; the ethereal atmosphere killed the bugs and prevented their reappearance. In the same way castor was freed of numerous insects, which likewise did not renew their attack.

It may be considered a matter of importance to try the effect of ether on the mites, the larvæ and bugs, which often make such a havoc with cantharides, the powdered as well as the whole insects. Though I cannot speak from experience, not having had occasion for such a trial, I little doubt the efficacy of ether, also in this instance. Chloroform probably might be of the same efficiency.

It may not be out of place here, to mention an attack of insects upon valerian root; I have never seen an account of its being subject to such, and always thought the highly penetrating odor of the root a sufficient safeguard; from late experience, however, this does not appear to be always the case. The cause of this attack I am unable to divine; I can only state, that all requirements for the safe keeping of the root had been faithfully complied with: it was clean and dry when stored away, and was kept in a well closed tin can, in a dry and ventilated wareroom. The larvæ of bugs had eaten through the thicker pieces of the root, so that on being broken, they crumbled into pieces, exhibiting in the passages the remains of chrysalides, small bugs and white wormy larvæ. The root was on hand about two years, and possessed the odor and taste of valerian in a high degree.

ON A FLUID EXTRACT OF BUCHU.

To the Editor of the American Journal of Pharmacy.

Dear Sir,—Having had many calls by physicians for a preparation of buchu, in which all the medicinal properties of the leaves should be obtained in a concentrated form and of reliable strength, many experiments have proved that a preparation made according to the subjoined recipe will give more general satisfaction than any heretofore in use:

Extractum Buchu fluidum.

℞.—Fol. Barosmæ Crenatæ,	℥lxxx. (coarsely ground.)
Alcohol, 85 per ct.	q. s.
Ether.	q. s.
Potassæ Carbonatis,	℥ii.

To the buchu leaves, placed in a close covered vessel, add 4 pints of alcohol, 95 per ct., mixed with 40 oz. of ether, allow them to macerate 12 hours, transfer to a suitable displacement apparatus, and pour on alcohol until 80 oz. have passed; set this aside and allow the ether to evaporate spontaneously; continue the percolation till 11 pints have been obtained; from this distil 9 pints, (at a heat not exceeding 200°;) to the remainder add the ethereal solution, and continue the distillation (if necessary) until the residue measures 80 fluid oz.; to this, whilst warm, add the carbonate of potash, (to dissolve the oleo-resinous matter thrown out of solution during the evaporation,) and filter. The dose generally is ℥ss. repeated several times a day.

Respectfully, yours,

J. Henry Harte.

Richmond, June 14th, 1858.

ON THE HYPOPHOSPHITES OF IRON.

By William Procter, Jr.

In the February number of this Journal, I published a paper on the medicinal hypophosphites recommended by Dr. Churchill, as valuable agents in phthisis, and at the same time brought forward the hypophosphite of sesquioxide of iron as an ingredient in a compound syrup of these salts, the formula for

which was appended. I was aware, at that time, of some peculiar characters of the ferric salt, and, among other points, with its comparatively great solubility in water at the ordinary temperature, yet this quality was overlooked in speaking of the salt, as the notice was very concise.

If a small quantity of the recent hypophosphite of iron is thrown on a filter, it may be entirely dissolved away by repeated ablutions of water, affording a colorless solution precipitated deep blue by ferrocyanide of iron. Practically, in making the hypophosphite of sesquioxide of iron, I have used a strong solution of sesquisulphate of iron, (containing about 100 grs. of sesquioxide to the fluid ounce), kept for the purpose of obtaining sesquioxide. The hypophosphite of soda is dissolved in about five times its weight of water, and the ferruginous solution added until it ceases to thicken the magma. The latter is then immediately thrown on a muslin strainer and expressed with the hand, and then mixed with its bulk of cold water and again expressed. The resulting salt is very compact, and by standing seems to contract and force out from its pores a part of the absorbed liquid. There still adheres to it traces of persulphate of iron and sulphate of soda, but the latter is unimportant, and the former is instantly converted into hypophosphite on the addition of the magma to the other hypophosphites in the preparation of the compound syrup.

Since then, Mr. William S. Thompson, of Baltimore, in a paper which has been copied at page 317, of this number, has noticed that in the presence of sugar this salt is de-oxidized and reduced to the state of a protosalt in the compound syrup alluded to, and that the change was not peculiar to this salt, but that persulphate and other persalts of iron were in like manner changed to protosalts. Happening to have several specimens of the compound syrup of hypophosphites of various ages, it occurred to me to try them with the two ferrocyanurets of iron, and I found the statements of Mr. Thompson to accord with my results, viz: the oldest syrup was most affected by the ferridcyanide, and the recent syrup the least; and the ferrocyanide produced deep coloration with the recent, and only caused a greenish color with the oldest syrup.

Assuming this change to be inevitable, Mr. T. adopts the idea

of substituting the hypophosphite of protoxide of iron for the sesquisalt, and, as will be seen by reference to his paper, gives a process for making it either by double decomposition between sulphate of iron and hypophosphite of lime, or by saturating the aqueous solution of hypophosphorous acid by means of recently precipitated protocarbonate of iron. It may, also, be prepared by saturating the solution of hypophosphorous acid with iron filings, which dissolve in this acid with the evolution of hydrogen, just as in diluted SO^3, producing a light greenish solution, which, by evaporation in vacuo yields a light green crystalline salt, easily effected by atmospheric oxygen.

The relative advantage of the ferrous and ferric hypophosphites in medicine has not been determined, so far as I am aware. Nor am I acquainted with the effects of time and exposure on the compound syrup of hypophosphites made with the proto salt. It is well known, however, that the syrup prepared with the sesqui salt of iron slowly deposits a pulverulent substance which is partially attached to the sides of the vessel, and which appears to be the result of atmospheric oxidation, as when the syrup is kept hermetically sealed it remains clear. It is probable that in this change, hypophosphite of sesquioxide becomes, by the absorption of oxygen, phosphate of sesquioxide, which precipitates—because it is insoluble in hypophosphorous acid.

In a note on this subject, in the May number of this Journal, I proposed a reduction in the amount of sugar, on the ground of its causing the precipitation of a portion of what I then supposed was hypophosphite of lime. Subsequently I became convinced, by experiment, that this precipitate was at least partially ferruginous. My friend J. M. Maisch, who also met with a like difficulty, made an analysis of the precipitate, as the following note will show.

PHILADELPHIA, May 17, 1858.

Dear Sir,—In the last number of the Amer. Journ. of Pharmacy, page 226, you state that when, in preparing the syrup of hypophosphites, "so much as twelve ounces of sugar is used to the pint, it is found to cause a precipitation of a portion of the *calcareous hypophosphite*," and in accordance with this observation you give another formula, by which the employment of heat in dissolving a much smaller quantity of sugar is obviated. In strict conformity with these latter directions, I have lately made this preparation, taking care to have the water boiling hot for washing the

mortar and filter. The result was, the commencement of a cloudiness after two or three hours, and a considerable precipitate after standing for about 24 hours. I determined to examine the nature of this precipitate, and accordingly it was well washed with cold water and dissolved in muriatic acid, which took it up without leaving any residue, and resulting in a perfectly clear solution with a decidedly brownish yellow coloration. To a part of this solution was added sulphuric acid, and afterwards, ammonia nearly to neutralization; a further addition of sulphuric acid caused no precipitation. The solution, treated in the same way with oxalic acid, was likewise not precipitated. These tests prove the absence of lime.

The solution was over-saturated with ammonia, which caused a brown precipitate. Ferrocyanuret of potassium immediately threw down a precipitate of Prussian blue, thus proving the presence of *sesquioxide of iron.*

The precipitate from the syrup was insoluble in hypophosphorous acid; to ascertain the acid, which was combined with the oxide of iron, I dissolved another portion in muriatic acid, supersaturated the solution by ammonia, filtered, acidulated with muriatic acid, added a drop of solution of sesquichloride of iron, and afterwards an excess of acetate of potassa. A white gelatinous precipitate of phosphate of sesquioxide of iron was the result.

The filtered solution containing an excess of free ammonia was mixed with sulphate of magnesia; a white precipitate of phosphate of ammonia and magnesia resulted, insoluble in ammonia, but soluble in acetic acid. By these reactions the presence of *phosphoric acid* is proven.

The same solution, neutralized with hydrochloric acid, caused white precipitates with nitrate of silver and chloride of mercury, (corrosive sublimate). After boiling, the color of both precipitates was unchanged, and no silver or mercury could be detected, even by a magnifying glass. This indicates the absence of phosphorous acid, and the precipitate from the syrup was *phosphate of sesquioxide of iron.*

Berzelius, in his "Lehrbuch," says of the hypophosphite of sesquioxide of iron: "It is white and little soluble in an excess of the acid. At ordinary temperature the oxide is not reduced to the protoxide; but on boiling the mixture, hypophosphite of protoxide of iron is dissolved, leaving *basic phosphate of sesquioxide* behind."

Would it, in consonance with these facts, not be better to treat the hypophosphites with water at an ordinary temperature, and perhaps reduce the amount of the iron salt to the quantity which then may be taken up by the hypophosphorous acid?

I remain yours, very respectfully, J. M. MAISCH.

The suggestion in the last paragraph had also been attended to, as I found the employment of very hot water to effect the character of the solution of the salts, unless a decided excess of acid was present.

PHARMACEUTICAL NOTICES.

Esteemed Editor,—I present herewith a formula for Fluid Extract of Wild Cherry and Iron, also one for Arsenite of Strychnia. The latter, though perhaps of but little promise, may not be devoid of interest.

Arsenite of Strychnia is formed by the double elective affinity between the arsenite of soda and hydrochlorate of strychnia in solution.

These salts, when properly prepared, do, by the process of double decomposition, produce the chloride of sodium and arsenite of strychnia, Stc, As O_3. The latter being soluble, may be separated from the solution of chloride of sodium by careful evaporation. The arsenite will first crystallize, by reason of its less solubility, in beautiful fine crystals, when the mother liquor, *containing chloride of sodium*, may be decanted and the crystals dried in folds of bibulous paper.

Ferrated Fluid Extract of Wild Cherry Bark.

I have prepared a Ferrated Fluid Extract of Wild Cherry Bark, which meets with high favor. I received the suggestion from prescriptions for combinations of Iron and Wild Cherry preparations. Guided by your instructions for the preparation of the simple fluid extract* I proceeded as follows:—

℞.—Cortex Prun. Virg. contus.	.	℥xii.
Amygdalæ Dulc.	. .	℥ij.
Ferri Oxyd. Hydrat.	. .	℥ss.
Sacch. Albi,	. . .	℥xij.
Ferri Citratis		
Alcoholis		
Aquæ font. *aa*	. .	q. s.

I first exhaust the bark of its tonic principles with the alcoholic menstruum, and the resulting alcoholic tincture I carefully evaporate to expel the alcohol, and then mix the residue with six ounces of water, and add the hydrated sesquioxide of iron; allow it to macerate for six hours, occasionally agitating, and filter into a bottle containing an emulsion of the almonds,

* Amer. Journ. Pharmacy, Jan. and March, 1856.

(amgyd. dulcis ℥ij., aqua pura ℥vj.) When the reaction has ceased between the emulsin and amygdalin, it is again filtered and the sugar added, and for every ounce thus to be prepared add gr. 24 of citrate of iron, previously dissolved in water sufficient to make the whole fluid extract measure twenty-four fluid ounces. The addition of iron to the bitter principle and hydrocyanic acid of the simple extract of wild cherry, I think should render it much more efficient as a tonic, and greatly add to the value of the preparation.

Cold Cream.—The following is my receipt for Cold Cream compound, which will be found to be a most elegant preparation.

℞.—Ol. Amygd. Dulc. . .	℥viij.
Cetacei	℥j.
Ceræ Albæ	℥ss.
Aquæ Rosæ	f.℥iij.
" Flor. Aurant. . .	f.℥j.
Glycerinæ	f.℥j.
Sodæ Boratis . . .	℥j.

By a gentle heat carefully melt and mix the oil, spermaceti and wax; to these, on cooling, add the medicated waters holding the borax and glycerin in solution and throughly incorporate in a mortar until cold.

Cream Syrups.—To Mr. A. B. Taylor we are indebted for the introduction of Cream Syrup, amongst other excelle nt things. This class of syrups has not depreciated in public favor when dispensed of good quality. But the speedy decomposition which the cream is liable to undergo, and the trouble of procuring it at all times, is a difficulty which it is desirable to remedy by offering a substitute. Below I give a receipt for Cream Syrup, which I have employed for some time, and which has gained no little celebrity.

℞.	Ol. Amygd. Dulcis (recent)	f.℥iij.
	Pv. Gum Acaciæ .	℥ij.
	Aq. font. . . .	℥ix.
M.	ft. emulsio et adde,	
	Albumen Ovi, No. 2.	
	Sacch. Albi . .	℔i.

M. Dissolve sugar by gentle heat, and strain; fill small bottles and keep in a cool place well corked. This preparation is easily made in a few minutes, and will keep for a long time. For use, mix one part with eight of any of the ordinary syrups, or about a drachm to every glass. It forms an unequalled orgeat by mixing two drachms or more with an ounce of simple syrup, and flavor with a mixture of bitter almond and orange-flower water.

Sarsaparilla Syrup for Mineral Water.

℞. Rad. Sarsaparillæ contus. 8 ounces
Cort. Sassafras
Sem. Anisi *aa* . 2 ounces
" Coriandri, . 1¼ "
" Fœniculi,
" Cari *aa* . 1 ounce
Fol. Ros. Gallicæ . 2 ounces
Rad. Glycyrrh. . 1 ounce

Macerate and displace one gallon liquid with water; add sugar 16 lbs., and dissolve with very moderate heat; color, if desirable, with cochineal. This is a very excellent syrup for mineral water. WILLIAM R. WARNER.

Philadelphia, June 21st, 1858.

ON HYPOPHOSPHITE OF IRON AND COMPOUND SYRUP OF HYPOPHOSPHITES.

By WILLIAM S. THOMPSON.

Read before the College, May 6th, 1858.

Hypophosphite of iron, like hypophosphites of the alkalies, is soluble in water.* This fact has doubtless been observed by many pharmaceutists who have attempted to prepare the com-

* [See page 312. It is not quite correct to say that hypophosphite of sesquioxide of iron is soluble *like* the alkaline salts, which are very soluble. By using dense cold solutions and not washing too profusely, there is no difficulty in preparing the salt.—ED. AMER. JOURN. PHARM.]

pound syrup of hypophosphites with hypophosphite of peroxide of iron, prepared by precipitation from a solution of persulphate of iron with hypophosphite of soda; which, if the manipulation is not carefully conducted, results in the loss of nearly all the iron salt and in the almost total absence of iron from the syrup when completed.

In the course of my experiments on this subject, I have observed that a persalt of iron in the presence of sugar, in solution, undergoes a change and is gradually converted into a protosalt. This remarkable fact may be proved by mixing a solution of persulphate of iron with about an equal bulk of simple syrup. At the end of a few hours the change may be observed by testing the mixture, and in a much more satisfactory manner in the course of two or three days, when the presence of the protosalt will be decidedly shown by adding a solution of ferricyanide of potassium to a portion of the mixture contained in a test tube.

I do not attempt an explanation of the exact nature of the change which takes place in this deoxidizing process, but it is evident that sugar deprives the peroxide of iron of one third of its oxygen to convert it into the protoxide.

The fact, that saccharine matter will effectually protect a protosalt of iron from the action of oxygen and conversion into a persalt, has been known for many years, and its discovery is attributed to Dr. Becker, a German physician. The idea was first carried out by Dr. Klauer, who first made the saccharine carbonate of iron; but I cannot find any *reason* assigned for the *fact* that this protective influence is exercised by sugar, nor any attempt to explain the mode of its action.

In Gmelin's Hand-book of Chemistry, vol. 5, page 201, the following paragraph occurs: "Ferric salts are reduced to the state of ferrous or ferroso-ferric salts by many vegetable substances; fresh grass, the green branches of trees and shrubs, hay, wood-shavings, saw-dust, peat and coal effect the reduction at ordinary temperatures; *sugar*, starch, gum, alcohol, turpentine, and shreds of paper at a boiling heat. (Stenhouse, Ann. Pharm. 51, 284.)"

This throws some light on the subject, but it seems to have

escaped the attention of the writer, that sugar acts as a reducing agent to persalts of iron, at ordinary temperatures, though not so rapidly as at a boiling heat.

From the foregoing observations I am led to infer that it is useless to introduce a persalt of iron into a preparation containing sugar, as it will invariably undergo conversion into a protosalt.

For forming the compound mentioned in the caption of this article, I propose the following formula, in which, for the sake of uniformity, I have preserved the proportions given in the formula of Prof. Procter as nearly as possible.

Take of	Hypophosphite of lime, . .	256 grains.
	Hypophosphite of soda, . . .	192 "
	Hypophosphite of potassa, . .	128 "
	Protosulphate of iron, crystallized, .	185 "
	Hypophosphorous acid,* sp. gr. 1.036,	9 fl. drs.
	White sugar, ...	12 ounces.
	Water, ...	a sufficient quantity.

Dissolve 96 grains of the hypophosphite of lime in four fluid ounces of water, with the aid of heat, and acidulate the solution with a small portion of the hypophosphorous acid. Dissolve the protosulphate of iron in two fluid ounces of water; mix the two solutions and allow the mixture to stand until the sulphate of lime, which is formed by their mutual decomposition, subsides, —which will be at the end of five or six hours—and pour the whole on a filter of white paper.

After the clear solution has passed through the filter, wash the adhering hypophosphite of iron from the sulphate of lime with a small quantity of water acidulated as before, and preserve the solution. Dissolve the remainder of the hypophosphite of lime with the hypophosphites of soda and potassa, in four fluid ounces of water, with the aid of heat, adding the remainder of the hypophosphorous acid. Mix the solutions, adding water sufficient to make the whole measure ten fluid ounces, which pour into a bottle containing the sugar and agitate the mixture occasionally until the solution is complete. Estimating the hy-

* This acid is prepared according to a formula by Prof. Procter, Amer. Jour. Pharmacy, Vol. XXX., p. 121.

pophosphorous acid as hypophosphite of lime, this syrup contains five grains of the combined hypophosphites in each fluid drachm, about $\frac{3}{4}$ of a grain of which is hypophosphite of protoxide of iron. There is necessarily, a trace of sulphate of lime in this syrup, which will be gradually deposited in the course of two or three days, after which it may be entirely separated by filtration through porous paper.

The hypophosphites of commerce nearly all contain impurities, unavoidable in their preparation on a large scale; such is free lime, soda and potassa and their carbonates; all of which are brought into a state of combination, by the free hypophosphorous acid used in this preparation.

Since the foregoing was written I have made a modification in the formula by which the syrup is free from the objection of containing sulphate of lime. The modified formula is as follows:

Take of	Hypophosphite of lime, . .	256 grains.
	Hypophosphite of soda, . . .	192 "
	Hypophosphite of potassa, . .	128 "
	Protosulphate of iron, crystallized, .	185 "
	Carbonate of soda, . . .	240 "
	Hypophosphorous acid, sp. gr. 1.036,	$3\frac{1}{2}$ fl. ounces.
	Sugar.	12 ounces.

Dissolve the protosulphate of iron and carbonate of soda, each separately, in four fluid ounces of water, and mix the solutions. Wash the precipitated carbonate of iron thoroughly with sweetened water and drain it on a muslin filter. Having placed the salts of lime, soda and potassa in a suitable porcelain dish, add about two fluid ounces of water and one fluid ounce of hypophosphorous acid; heat the mixture gently, and add the moist carbonate of iron, in small portions, from time to time, alternately with the hypophosphorous acid, until the solution is complete. Add water enough to make the whole measure ten fluid ounces; pour it into a bottle containing the sugar and agitate as before.—*Jour. and Trans. of Maryland College of Pharm. June*, 1858.

NOTE ON SOME PRODUCTS OF THE TEREBINTH (*PISTACIA TEREBINTHUS*, L.)

By SIDNEY H. MALTASS, ESQ., OF SMYRNA.

(Extracted from a Communication to Mr. Daniel Hanbury.)

By the modern Greeks, the terebinth, *Pistacia terebinthus*, L., is called Τσικουδιὰ. The Turks name it *Tcetlembik*, and the Europeans *Petelin* or *Petelino*. In the Levant it is generally diffused, being found wild in all parts of Asia Minor, in the islands of the Archipelago, in Syria, in Cyprus, &c. When occurring on stony ground and in elevated situations, it is a mere shrub, but in the plains and in other favorable localities, it frequently attains considerable proportions. The leaves appear early in the spring, and immediately are followed by the flowers. The fruit, which forms large clusters, is at first green, and shortly afterwards of a bright red color. In October, after the first autumnal rains, it changes to a bluish-green, occasionally with a purple tinge. In this state it is considered ripe, and is gathered for the market. It is then of the size of a small pea. Its outer skin has a not unpleasant taste of turpentine, while the kernel possesses the delicate flavor of the pistachio. These fruits are the favorite food of the Oriole (*Oriolus galbula*), the Blackcap (*Sylvia atricapilla*), the Redcap (*Sylvia rubricapilla*),* and the Flycatcher (*Muscicapa grisola*)—the last three known in Smyrna and elsewhere under the name of *Beccafico*. In Scio, where the fruit ripens earlier, the kernels are eaten and much esteemed. They are also valued on account of the fixed oil which they afford, and which is used by the lower classes in the same manner as olive oil.

It is in this island also that the resin of the terebinth, known as Scio or Chian Turpentine, is collected. Levrault, whose account is very explicit and correct, says that although the turpentine exudes to some extent spontaneously, it is produced more abundantly from incisions which are made in the trunk and branches

* Is not the bird here intended, the Stone-chat Warbler (*Sylvia rubicola*), whose flesh, Cuvier says, is in autumn fat and delicate, and not inferior in flavor to that of the *beccafico*?

Sylvia rubricapilla is a name I cannot identify.—D. H.

in the spring, and from which the resin continues to flow during the whole summer. It is in the morning, says he, after the coolness of the night has somewhat solidified it, that the resin is scraped from the stem and from the flat stones placed at the foot of the tree to receive that which may have run down. As the resin thus collected is always mixed with some foreign matters, it is purified by straining through small baskets, after having been liquified by exposure to the heat of the sun. As the produce is very scanty, a tree of four to five feet circumference yielding ordinarily not more than ten or eleven ounces per annum, Scio turpentine is dear even in the island where it is collected. Dr. Barbieri of Scio informs me that at present the trade is almost exclusively in the hands of Jews, who dispose of the resin in the interior of the Turkish empire. During the last two or three years, some small parcels have been procured, on account of orders received from Europe, but it was not known in Scio for what purpose the resin was required.

Dr. Barbieri has further stated that Scio turpentine, besides being used externally and internally in medicine, is said to be mixed in many places in small proportions with wine, for the purpose, as it is asserted, of preserving it, especially where it has to be shipped. I am also assured that the resin is consumed in the island of Candia for the purpose of flavoring *raki*, a spirit containing aniseed, extensively used in all parts of the Levant. It is certain, however, that in Greece and other parts where wine is flavored with resin, that of the red pine is used.

Another curious purpose for which Scio turpentine is employed, not only in Scio, but in other parts of the Levant, is in the extraction of superfluous hairs from the face and eyebrows, as well as from the arms and legs of the Eastern ladies.*

[With reference to the foregoing, we have been favored with the following note from Dr. Arthur Leared :—

"I have seen the Terebinth (*Pistacia terebinthus*, L.) in the

* Dr. Barbieri thus describes it :—

" * * * qualmente in mano esperta i fili di seta colla suddetta resina serve a uno uso essenziellissimo immancabile della toiletta delle belle di Levante, cioè l'estirpazione della lanuzza della faccia, e il regolare ordinamento dei supraciglie primo che quella e questi siano abelliti dei colori che lore convengono."

island of Scio and in the neighborhood of Smyrna. In the latter locality it may be found in most gardens and shrubberies. In a tree of moderate size, having some resemblance to the mountain ash. Its fruits, which are called by the Smyrniotes *Tzecoutha*, occur in a profusion of clusters, and ripen in September. This period is looked forward to as the season for shooting *beccaficos*, or as they are called by the English, *beefigs*. Three or four species of very small birds are included under this designation. The Smyrniotes pursue this sport with avidity, but in a manner peculiarly oriental. The sportsman takes his place, often seated in a chair, close to a terebinth tree, in which some of the birds are sure to be found, and fires at any becfig that gives him the chance. At the report of the gun the birds fly away to a short distance, but return so quickly, that opportunity for a second shot is frequently afforded by the time the sportsman has reloaded. Great numbers of birds are sometimes thus killed at a *sitting*. They are very fat, and on this account, and for their fine flavor, are much esteemed for the *pilaff*."]—*London Pharm. Journ.*, *May*, 1858.

THE CHEMICAL MEANS OF RENDERING TIMBER INCOMBUSTIBLE.

By JOHN S. BLOCKEY.

Within the last few months my attention has been occasionally called to papers, in "The Mechanics' Magazine" and elsewhere, as to certain new methods or new appliances for rendering timber incombustible. The more so, as in September last I was engaged in a series of experiments, the result of which I here beg leave to state, and solicit a trial of their correctness. In all cases I had learned that silicate of potassa, or soda, was the most commercially useful compound for the purpose, and with this (the application of which, I may remind the readers of "THE CHEMIST," is not new) I set out. Having prepared a solution of tolerably pure silicate, such as I conceived would be used on the large scale, I soaked a number of pieces of wood in it for twelve hours, having previously thoroughly dried them in an oven moderately heated; they were then again dried, and half of them placed in dilute hydrochloric acid, the other half dried without

the acid treatment. I thought that if beams of timber were prepared in this way there would be less chance of the protecting crust washing out by use, rain, or sea carriage, in consequence of the silica being rendered insoluble by the acid treatment. The pieces of wood being finally all dried, were placed in a heap, and a gas jet lighted beneath them; the result was, as might be anticipated, the coating of silicate of potassa, and silica prevents the wood actually "adding fuel to the fire," except only in this way:—when a body of heated matter surrounds it the wood becomes subject to destructive distillation—it cracks, exposes numerous fissures in its surface, from which inflammable gas is given out, and then in many instances the pieces of wood separate into smaller fragments, and combustion goes on to a considerable extent, though I never found any result which would justify me in saying that silica does not, to a certain extent, prevent combustion; at the same time I can only repeat the sentiments I uttered in the *Manchester Guardian*, in January last, on this subject (as to a statement that M. Carteron had done something wonderful in France in this matter) that the mere fact of a substance being of an organic nature like wood, capable of being made to yield large quantities of inflammable gas by destructive distillation, which gas is itself practically employed in heating the retorts from which acetic acid is distilled, must necessarily go to prove that even a near approach to perfection in this matter can never be reasonably expected; moreover it is questionable whether the aqueous vapor driven off is not decomposed by the surrounding particles of incandescent carbon into water gas. But it may be said that the timber does not itself blaze, and so that a screen or partition of wood prepared in this way would effectually prevent the spread of flame; this I can safely grant to be correct within certain limits; but considering the immense heat generated in the conflagration of a single house, I do not see how the timber could escape the action of destructive distillation. But here, again, I am ready to admit, that if every fabric, even to the dresses of the inmates were fire-proofed, nay, if every individual article of an organic nature were treated with some substance of this sort, fires could not produce such devastating effects as we are frequently horrified at reading; and surely if the subject were properly taken up, the matter would

be found of sufficient importance to justify some trouble by those in the right place to have weight in the matter. My talented and respected friend, Professor Crace Calvert, suggests the use of sulphate of ammonia (an excessively cheap salt) to be applied to such things as curtains, carpets, &c., after every cleaning.

Professor Abel has lately drawn attention to this subject at Woolwich, and a patent has been taken out (as is always done directly public attention is drawn to a fact, however long known before to scientific men, though never really applied) for a modification of this silicate of soda and its application. One thing occurred to me; that if the whole structure of the timber could be impregnated with the protecting substance, it would be beneficial, and borrowing a scrap of Kyan's Invention, I fancied his cylinders and steam, vacuum, and so on, could be applied to this end, merely substituting silicate of soda for his anteseptic compound; and after entertaining this idea with myself and a friend for a month or two, I am gratified to see the thing already in practice by Lieutenant Jackson.

There is one thing that suggests itself to me, and that is, that the cost of apparatus, &c., besides greatly additional trouble, would, also, create great prejudice against its adoption. The object, then, of this communication, is principally to suggest what I fancy is at least worth trying by those having power to do so—that before the tree is felled a hole be bored in its trunk through the bark straight to the heart or pith; that a vacuum be then partially created in its cells and arteries, by the exhaustion of the sap and the introduction of a solution of silicate of potassa, or soda in its place.

Will not the silicate gradually and surely deposit itself in every interstice of the fibre of the wood without any further trouble? As I conceive such events as those of Gilbert Street, &c., behove all to do their mite, I beg leave respectfully to suggest this idea to the consideration of those better able to judge of its value than myself, and to conclude in the well-known words, "Non omnia omnes possumus," leaving the question to be answered by those capable of doing so.—*London Chemist, May*, 1858.

ON A NEW PROCESS FOR PAINTING WITH OXYCHLORIDE OF ZINC.

By M. Sorel.

In 1855 I had the honor of presenting to the Academy various products obtained by means of oxychloride of zinc, especially cements and mastics, as hard as marble and quite insoluble in water, and a paint, equally insoluble, intended to replace, very economically, oil and other painting. This paint had the inconvenience of being difficult to use, and of requiring, like siliceous painting, the application of a liquid on the last layer to fix it and render it insoluble; when I wished to avoid the use of this liquid by rendering my paint more drying, I was met by an equally serious inconvenience: the paint thickened very rapidly in the vessel, and there was not time to use it. I have now succeeded, by adding certain substances to my liquid, in surmounting these difficulties, and rendering the application of this new paint easy.

The liquid which in this paint replaces oil, essence of turpentine, and the other liquids and excipients used in ordinary painting, is an aqueous solution of chloride of zinc, in which I have dissolved an alkaline tartrate. These salts possess in the highest degree the property of retarding the thickening of the new paint before being used. I add to the liquid, to give tenacity to the paint, gelatine or fecula, which I have caused to pass into the state of starch by heating the liquid. It must not be heated so much as to transform the fecula into dextrine or glucose.

To form the new paint, whatever the color may be, I use the above liquid, and a powder which should be in great part oxide of zinc. For colored paints I use the same powder *plus* the coloring matters. The colors usually employed in ordinary painting may be employed.

The new paint possesses the following properties:—1st. It is not necessary to grind it; the powder only requires to be diluted with the liquid, and the paint is used in the ordinary manner. 2nd. It is more beautiful and solid than oil paint; it covers better and is not rendered black by sulphurous emanations, like paints of ceruse or other lead bases. 3rd. It is absolutely without odor, and dries very rapidly. We can apply a layer every

two hours in winter and every hour in summer; which enables us to paint an apartment in one day and inhabit it the same day, without being affected by the odor of the paint. 4th. It resists moisture and water, even when boiling, and may be washed with soap like oil paint. 5th. In consequence of the chloride of zinc which it contains, the paint is eminently antiseptic and fitted to preserve wood from perishing. 6th. It possesses to a very high degree the quality of diminishing the combustibility of wood, fabrics, and paper, and of rendering these matters uninflammable. 7th. It is perfectly innoccuous both to those who prepare and those who use it.

I have also the honor of placing before the Academy a new translucid plastic matter which is formed with the principal elements of the paint of which I have just spoken, but in very different proportions. It is a combination of potato fecula and hydrated chloride of zinc, of a sufficient density to swell the fecula without dissolving it. To modify the hardness of the matter and to render it more or less white or more or less opaque, certain salts or powdered matters are added, such as oxide of zinc, sulphate of baryta, &c. This plastic matter is prepared cold by moistening the fecula and other matters with chloride of zinc. This new compound is easily moulded, and solidifies in the mould like plaster. The objects thus obtained are as translucid as horn, bone, or ivory; but to obtain this translucidness very little or none of the moist pulverulent substances must be introduced, except sulphate of baryta. This salt, although insoluble, give very little opacity to the matter. This is not the case with oxide of zinc or carbonate of lime.

To keep the objects thus obtained from moisture, they are covered with one or two layers of good varnish.

Any color may be given to this new matter, and it may be obtained more or less hard; it may even be obtained as supple as caoutchouc, but not elastic.

This new plastic compound may be used for moulding many objects of art and ornament, and in the manufacture of many things requiring either hardness, suppleness, or transparency. This substance may replace, in many cases, plaster, marble, ivory, horn, bone, gutta-percha, gelatine, etc.—*London Chem.*, *May* 1858, *from Comptes Rendus, March* 1858.

ON FERMENTATION.

By M. Pasteur.

M. Pasteur has extended his observations of the characters of amylic alcohol, and of the crystallography of its derivatives, to the investigation of the phenomena of fermentation, and has arrived at results which he believes to indicate a remarkable connexion between the phenomena of fermentation and the characters of molecular dissymetry of organic substances.

He treats first of that kind of fermentation which gives rise to the production of lactic acid. This is known to take place when a solution of sugar, mixed with chalk, for the purpose of keeping the liquid neutral, is brought in contact with nitrogenous substances, such as casein, gluten, animal membrane, &c. The essential nature of this phenomenon is, however, very obscure; the special influence of the nitrogenous substance is altogether unknown. Its mass is not sensibly diminished. It does not necessarily become putrid. Nevertheless, it undergoes a progressive alteration, although it is difficult to say in what this alteration may consist.

Previous investigations have not led to the detection of the development of vital organisms during the lactic acid fermentation, otherwise than accidentally, and without any intimate connexion with the process itself.

These facts appear, therefore, to bear out the views of Professor Liebig, who regards a ferment as a substance eminently susceptible of change, and capable, while undergoing decomposition, of exciting fermentation of a substance with which it is in contact, as a consequence of its own alteration, by disturbing the molecular constitution of the fermentible substance. According to Professor Liebig, this is the primary cause of all kinds of fermentation, and also the origin of most contagious diseases.

This view has gradually gained recognition, and has been maintained in the memoirs written on the subject by MM. Fremy and Boutron, M. Gerhardt, and quite recently, by M. Berthelot. The investigations of these chemists all agree in tending to discredit the influence, in any way, of organization and vitality, as the cause of the phenomena of fermentation.

M. Pasteur has, however, been induced to adopt an entirely

different view. In the first place, he endeavors to prove, tha in the same way that there is a special alcoholic ferment—beer-yeast—which is met with wherever sugar is converted into alcohol and carbonic acid; so in like manner there is a lactic ferment, which presents itself wherever sugar is converted into lactic acid, and if any nitrogenous substance is capable of inducing this latter change, it is by furnishing the material requisite for the development of the appropriate ferment.

During the progress of the ordinary lactic acid fermentation, it is sometimes possible to recognize, above the sediment of chalk and nitrogenous substance, particles of a grey substance, forming a zone upon the surface of the sediment. When these particles are examined by the aid of the microscope, it is scarcely possible to detect any disintegrated casein or gluten, so that there is nothing to indicate that this is a peculiar substance that has originated during the progress of the fermentation. Nevertheless, M. Pasteur regards this substance as exercising a principal and essential influence. The following is the plan he adopted for obtaining it apart, and in a state of purity.

Beer-yeast was deprived of its soluble portion by digesting it for some time with fifteen or twenty times its weight of boiling water. In the filtered liquid, sugar was dissolved, in the proportion of fifty grammes to the litre. Some chalk was then added, and a very small portion of the grey substance spoken of above taken from a liquid in an active state of lactic fermentation. By the next day active and regular fermentation had set in. The liquid, which at first was perfectly clear, had become turbid, the chalk gradually disappeared, and at the same time a sediment was deposited, increasing in proportion to the solution of the chalk. In addition, all the well known characteristic features of lactic fermentation were presented by the liquid. With the same result, the decoction of beer-yeast might be replaced by a decoction of any other nitrogenous substance, either in a fresh or stale condition.

The characters of this substance, whose production is correlative with the phenomena included by the term lactic fermentation, are thus described by M. Pasteur. In appearance it resembles beer-yeast in a strained or pressed state. Examined by the aid of the microscope, it is seen to consist of little

globules or very short articulations, either isolated or in threads, constituting irregular flocculent particles. The globules are very much smaller than those of beer-yeast, and also present the Brownian motion. When washed with a large quantity of water, and then disseminated throughout some pure solution of sugar, acidification is produced immediately, and progresses, though very gradually, in consequence of the acid interfering with the influence of the ferment upon the sugar. But when chalk is added, so as to keep the liquid neutral, the transformation of the sugar is much accelerated; and, even when operating with a very small quantity of substance, in less than an hour the disengagement of gas becomes evident, while the liquid becomes charged with lactate and butyrate of lime. A very small quantity of this ferment is sufficient to effect the transformation of a large amount of sugar.

Hence, M. Pasteur infers that the lactic fermentation resembles the alcoholic fermentation, in being an act correlative to the production of a nitrogenous substance, which has all the characters of a micodermic organism, probably very similar to that of beer-yeast. But the difficulties and complexity of the subject are far from being resolved by this fact. Lactic acid, although the principal product of the fermentation called lactic, is far from being the only one. It is always accompanied by butyric acid, alcohol, mannite, and a viscous substance, the relative proportion of these substances being subject to the most capricious variations. With regard to mannite, a very remarkable circumstance was observed—when substituted for sugar in the lactic fermentation, all other conditions remaining the same, alcohol is produced, together with lactic acid and butyric acid, by the fermentation of the mannite. This fact appears, at first sight, inconsistent with the production of mannite in lactic fermentation, at least it might be supposed that it would be decomposed again. But this apparent inconsistency is removed by a more close examination.

Thus, when the lactic ferment has been washed with a large quantity of water, and placed in contact with a solution of pure sugar, the transformation of the sugar decreases as the acidity of the liquid increases. By the analysis of the liquid, after neutralizing the acid with chalk and decomposing the residual

sugar by fermentation with beer-yeast, M. Pasteur found that it contained mannite and the viscous substance before mentioned, and he invariably found that sugar, brought in contact with the lactic ferment, is transformed into products, among which mannite is always present; but this is the case only when the liquid rapidly becomes acid, for when the liquid was kept neutral by the addition of chalk, all other circumstances remaining the same, neither gum nor mannite were produced; or, at least, neither of these substances remained in the liquid unaltered.

M. Berthelot has already shown that by substituting mannite for sugar in the lactic fermentation, that substance undergoes fermentation. It is easy to ascertain that in the numerous cases of fermentation of mannite, it is due to the production of the lactic ferment. When a solution of pure mannite is mixed with chalk and some fresh washed lactic ferment, at the end of a quarter of an hour disengagement of gas commences, and the chemical change of the mannite takes place, the products being carbonic acid, hydrogen, alcohol, lactic acid, butyric acid, and all the other products of the fermentation of mannite.

With regard to the production of butyric acid, experience has shown that the lactic ferment acts directly upon lactate of lime, converting it into carbonate and butyrate of lime. But the action of the ferment is first exercised upon sugar, and when it is present in the liquid, it undergoes fermentation in preference to lactic acid.

M. Pasteur has also studied the alcoholic fermentation experimentally, in the same manner. In reference to this phenomenon, he distinguishes as two principal cases, the action of beer-yeast upon a solution of pure sugar, and its action in the presence of albuminous substances. In the former case the yeast is exhausted, and becomes incapable of inducing further fermentation. In the latter case the activity of the yeast is not destroyed. In fact, the quantity remaining after the fermentation, is greater than that used. It is therefore regenerated, or rather it is exhausted, as in the former case; but since fresh ferment is produced, the consumption is disguised by the production. The amount of ferment that is consumed, is estimated in reference to the sugar, at about one per cent. of dry substance.

The decomposition of ferment accompanying its action upon

pure sugar, is one of the facts most important in relation to the theory of Professor Liebig, who remarks in reference to it, that "if the fermentation were a consequence of the developement and multiplication of the globules, they would not excite fermentation in a solution of pure sugar, which is destitute of other conditions essential for the manifestation of vital activity; this liquid containing no nitrogenous substance necessary for the production of the nitrogenous portion of the globules."

It cannot be denied that if well washed beer-yeast placed in contact with a solution of pure sugar, undergoes alteration, and is destroyed, there can be no possibility of pretending that alcoholic fermentation is a phenomenon correlative with the developement of the globules.

But M. Pasteur goes on to show that the facts upon which Prof. Liebig bases his argument do not possess that degree of exactitude which has been ascribed to them; and also that, in the fermentation of a solution of pure sugar, there is an amount of vitality and organization equal to that manifested in the more ordinary case.

With the object of illustrating this experimentally, he took two equal quantities of fresh beer-yeast that had been washed with a large quantity of water, and placed one in contact with a solution of pure sugar. From the other portion, the whole of the soluble substance was extracted, by digesting it for some time with a large quantity of boiling water; the globules were separated by filtration; the clear liquid mixed with sugar, as in the other experiments; and so small a quantity of the fresh yeast added as would not interfere with the results of the experiment. The globules increased, the liquid became turbid, a sediment of yeast was gradually deposited, and meanwhile the sugar was transformed. These results might easily have been anticipated; but there is another fact which M. Pasteur points out as important to be considered. In determining by this artifice, the conversion of the soluble portion of yeast into organized globules, a considerable quantity of sugar is decomposed. In one instance, 5 grammes of yeast effected the decomposition of 12.9 grammes of sugar within six days, and was then exhausted. The soluble portion of 5 grammes of this yeast effected the decomposition

of 10 grammes of sugar within nine days, and the yeast developed was also exhausted.

It appears, therefore, that, by bringing about the conversion of the soluble portion of yeast into organized globules, a quantity of sugar may be decomposed which is nearly equal to that decomposed by the action of an equivalent quantity of the yeast in its natural state. The difference between the two quantities of sugar fermented in the above instance appears, moreover, easily explicable. The developement of globules in the very dilute decoction of yeast may be expected to be retarded, and the extraction with water would probably not effect the separation of all the soluble portion of the yeast probably confined within the globules.

These results are directly connected with the explication of facts relating to the history of fermentation that have always appeared extraordinary. M. Thenard long since observed that yeast may be dried at 212° F., or heated to the boiling point, without its efficacy as a ferment being sensibly diminished. The sole peculiarity of its action under these circumstances, consists in the commencement and progress of the fermentation being slower than when the same yeast is used in the fresh state. These curious facts have been put forward by those chemists who adopt the views of Liebig and Berzelius, and deny the influence of organization as a cause of the phenomena of fermentation. It was argued, that exposure to a temperature of 212° F., whether combined with prolonged drying or not, would destroy the vitality of the yeast; and that, notwithstanding this treatment, the yeast will act as a ferment.

M. Pasteur's results, however, show that it is not the globules which exercise the most important function in fermentation, but the conversion of the soluble portion of the yeast into organized globules; for he shows that, when the globules are abstracted, the ultimate effect produced upon the sugar is essentially the same as when they are present. Therefore, it is certainly of little consequence, whether the globules are abstracted by filtration, as in M. Pasteur's experiment; or whether, when left mixed with the soluble portion, their vitality is destroyed by exposure to a temperature of 212° F., as in using yeast that has been dried at that temperature, or boiled with water. The

globules collected by filtration, after having been exposed to a temperature of 212° F., are almost entirely incapable of exciting fermentation.

But, it may be asked, why does the fermentation of sugar take place under the influence of yeast that has been heated to 212° F., if that fermentation is only due to the conversion of the soluble portion of yeast into organized globules, seeing that such treatment would have the effect of destroying the vitality of the globules? With regard to this point, M. Pasteur believes that fermentation is commenced in such a case, in the same manner that it sets in with any saccharine liquid—such as grape juice, sugar-cane juice, &c.—that is to say, spontaneously; and he believes that to this mode of origin is to be ascribed the retardation, characteristic of fermentation produced by yeast that has been dried at 212° F., as well as its longer duration in this case.

Hence it would appear that in all cases, even those which might be regarded as furnishing the chief support of the opinion that organization does not exercise any casual influence on the phenomena of fermentation, the chemical change by which they are characterized is always correlative with the gradual and progressive formation of the organized globules.

M. Pasteur has also made some further observations, which confirm the results described already, and also throw a new light on the subject of fermentation. The existing theory sets out from the assumption that the ferment does not contribute anything to, or abstract anything from the fermenting substance. M. Pasteur, however, endeavors to show that this is not a correct representation of the fact, but that the yeast does abstract substance from the sugar, that the sugar is one of its aliments, and that there is not a chemical equivalence between the quantities of alcohol, and carbonic acid (lactic acid,) on the one hand, and the quantity of sugar fermented on the other.

For the purpose of illustrating these facts he took two equal portions of well washed fresh yeast, dried one in a capsule, and ascertained the weight at 212° F. This weight would in any case be inferior to that of the other portion, also dried at 212° F., and collected only after it had been exhausted in the presence of an excess of sugar. The difference of weight was found to be variable, but it was always very sensible. It must be stated

also that the most considerable sources of loss obtained in the case of that portion of yeast which weighed the most. This curious and unexpected result admits of the explication of a fact which, at the outset of M. Pasteur's investigations, caused him much surprise. When yeast is exhausted in contact with a solution of pure sugar, it is admitted that the whole of its nitrogen passes into the state of an ammoniacal salt. In reality the quantity of ammonia produced during the fermentation is excessively minute, and very much less than that which should be obtained in order to account for the diminution of the amount of nitrogen in the yeast. But the diminution of azote is only apparent. It is due to the augmentation of the weight of the yeast by assimilation of sugar.

The inferences to be drawn from the preceding facts will be sufficiently evident. The transformation of sugar into alcohol and carbonic acid must be regarded as an act correlative with a vital phenomenon, an organization of globules in which the sugar takes a direct part, by furnishing material for their production.

Another result to which M. Pasteur attaches great importance, is the discovery of a mode of fermenting tartaric acid which affects the ordinary dextro-tartaric acid, but not the levo-tartaric acid. Consequently, when paratartaric acid, consisting of a mixture, molecule for molecule, of the two kinds of tartaric acid, is submitted to this mode of fermentation, the paratartaric acid is decomposed into dextro-tartaric acid, which ferments, and into levo-tartaric acid, which remains intact, so that this treatment is the best means of isolating the levo-tartaric acid.

He adds, also, that the products of the fermentation of tartaric acid, compared with those of the acids obtained by the fermentation of ordinary sugar, and joined to the curious relations between the crystalline forms of cane-sugar and dextro-tartaric acid, justify the opinion that cane-sugar has probably the same molecular constitution as that acid.—*London Pharm. Jour.*, *April* 1, 1858.

OIL OF THE DUGONG A SUBSTITUTE FOR COD-LIVER OIL.

Australia offers us an oil which seems likely to prove a most agreeable and efficient substitute for cod-liver oil. A cetaceous

animal, the dugong (*Halicore Australis* or *Halicore Dugong* of Cuvier,) inhabits the rivers and bays of the eastern coast of Australia, and many of the islands of the Indian Archipelago. It feeds on the submarine algæ and fuci of shallow waters. It attains a length of seven or eight feet, and is described as something between a porpoise and a seal. The flesh is highly esteemed as a tender food, not unlike beef, and it yields an oil so bland and sweet, so free from disagreeble flavor or odor, that it may be given in much larger doses than cod-liver oil. Mr. W. Hobbs, a surgeon practising at Brisbane, Moreton Bay, has used the oil extensively in many chronic diseases. He is spoken of by our correspondent as a most intelligent man, and from his reports we should certainly conclude that the oil possesses all the useful properties of cod-liver oil. The evidence, to say the least, is sufficient to encourage a trial of the oil in this country, and we trust some Australian merchant will secure a supply without delay.—*London Chemist, May* 1858, *from Medical Times and Gazette.*

SOLUBLE SILICATE OF SODA, WATER GLASS, OR MINERAL GUM.

Dr. Edwards introduced specimens of "Water Glass," and a solution of the same, sold as "Mineral Gum," substances which were being largely manufactured near Liverpool, and applied to several important purposes of commerce. The substance is a silicate of soda, being a transparent green glass, long known to Chemists as "Soluble Glass." It has only recently attracted the notice of manufacturers, who now find it possesses properties rendering it highly useful, and indeed remarkable for the variety of its applications. It is prepared from quartz sand, and soda ash. The glass is very finely ground, and then dissolved by the agency of hot water and steam. The solution is then concentrated to 20°, 30°, or 50° of Twaddle, and sold of the strength best adapted for the purpose contemplated. A large demand has recently arisen for it as a size for calicoes, &c., in lieu of British gum, the glaze being superior, and the price (£6 to £7 a on) being lower.

It is also getting in demand for soap-making, being itself a

detergent, and mixed with common soap, preventing the usual loss by evaporation, and increasing the weight. It has been used by several parties in this country and abroad for saturating timbers, scenery, dresses, and other inflammable material, being itself of a highly incombustible nature, and thus protecting other substances to a great extent from the action of fire. The solution consolidates into a clear glass or varnish, which is not acted on by cold water, and may therefore be freely washed therewith. In contact with lime it consolidates, and is partly converted into silicate of lime. Hence it has been employed especially in Berlin, in the process called "Stereochrome," a revival of fresco painting on the walls of buildings; the design being perfectly protected by the application of a solution of the "water glass," as a varnish over the surface. This may be freely washed, and, if necessary, renewed from time to time.

The same substance is the essential element in Ransome's artificial stone process, and other similar processes, in which a porous sandstone or limestone is saturated with this silicate, which not only consolidates, but combines with the lime, forming a compact mass of flinty hardness, and impervious to atmospheric influence.

Its solution possesses highly adhesive properties, and may be considered the basis of a good cement for glass or china. By itself it holds fragments with great tenacity in the cold, but yields on the application of heat. The solution for this purpose must not be too strong, and if mixed, when used, with a little lime, the cement is very firm.

With such a variety of useful properties, the hope may be entertained that some application of it may be suggested available to purposes of Pharmacy.—*London Pharm. Journ., May*, 1851.

DR. ROYLE ON COTTON CULTURE IN INDIA.*

The recent death of Dr. Forbes Royle cannot but be regarded as a loss to India. No man living was so well acquainted with the productive resources of our Eastern empire, or so capable of

* Review of the Measures which have been adopted in India for the Improved Culture of Cotton. By J. Forbes Royle, M. D., F. R. S.

giving advice as their development in the new epoch which will date from the suppression of the Sepoy revolt. Whatever alteration may take place in the political government of India, there is no doubt that changes are at hand in the industrial and commercial relations of the country. Want of British colonists and of British capital have hindered progress up to this time, but the preliminary work of exploration and inquiry has meanwhile been going on; and among those who have supplied scientific information likely to be turned to good practical account, the first place is due to Dr. Royle. During thirty years' service in the East he filled various important situations; one of which was the superintendence of the Hon. Company's Botanic Garden at Saharunpore. Since his return to England—whether as Professor in King's College, London, or as a director of the Great Exhibition of 1851, or as the author of valuable treatises—he has assiduously labored to attract attention to the productive resources of India. His latest work, completed shortly before the illness preceding his lamented death, was a review of the measures which have been adopted in India for the improved culture of cotton,—an inquiry of deep interest to the philanthropist and the statesman, as well as to the merchant, manufacturer, and capitalist.

In 1851, Dr. Royle published a more extended work on "The Culture and Commerce of Cotton in India." These two branches of the subject are in themselves distinct, as much so as was the controversy about the Corn Laws from questions of agricultural improvement in our own country. In treating of Indian cotton culture, the inquiry is simply how to increase and to improve the article produced, whether for local consumption, or for competing in the European market with American produce. But, in considering the commerce in cotton, the subject is complicated by a variety of social and political questions. Dr. Royle's opinions on these will have due weight, and his historical account of the Indian cotton commerce will be useful for reference; but the most valuable part of his work is that which treats of the principles and practice of cotton culture. The *Review* lately published contains an analysis and report of observations and experiments down to the most recent date.

The Indian cotton-plant is a distinct species,—the *Gossypium*

Indicum and *G. herbaceum* of different botanists. In geographical range it extends over all the regions of India, and grows in the hottest and moistest as well as the driest districts. The varieties arising from soil and climate are all shorter in staple than the American cottons, and in this consists their chief inferiority for the European market. But the Indian cotton has peculiar advantages of its own. Its color is good; it takes dye well; and yarns spun with it swell in bleaching, thereby giving to the fabrics a closer texture. For strength and durability the natives prefer their own cotton; and the famous muslins of Dacca show how fine the manufactures are of which it is capable. There are several other species indigenous in India, such as the *Gossypium arboreum;* but, though yielding fine cotton, they are not cultivated as a field crop, the produce not repaying the expense of culture. That cotton was spun and woven in the East from the remotest times, we know from its being mentioned in Sanscrit writings twelve hundred years before the Christian era. The discovery of cotton-wool and cotton fabrics in ancient Peruvian tombs proves that America possesses indigenous cotton-plants independent of importation from the Old World; as, indeed, was reported by Columbus, Cortes, and the first European explorers. The *Gossypium Barbadense* of botanists is the species furnishing all the cotton of North America and of the West India Islands; that of Brazil, Peru, and South America generally, is the produce of the *G. Peruvianum*—a species marked by its black seeds, and their adhering firmly together. From North America the *G. Barbadense* was introduced into the Mauritius and the Isle of Bourbon, and thence to India, where the plant has become a permanent variety, and its produce is called Bourbon cotton. The great bulk of the native-grown cotton is produced from the indigenous species, with little variation either of culture or of manufacture from what prevailed three thousand years ago. It is only in recent times, since the possibility has been contemplated of the American supply failing the British market, that attention has been fairly directed to India as a cotton-exporting country.

We must refer to Dr. Royle's book for the detailed reports of what has been done, in the way of experimental culture. In 1829, the Agricultural Society of India, with the assistance of

the Government, made the first systematic attempt to introduce American culture at Akra, near Calcutta. In 1840, a series of experiments on a larger scale was commenced in eight different parts of India by American planters, with American seeds, tools, and cotton-cleaning machines. The results varied, as might be expected, from the variety of soils and climates at the different farms; but the conclusion at which Dr. Royle arrives, from a review of these and of other experimental trials under the most favorable conditions, is, on the whole, not encouraging. The trials have been made in all the Presidencies; in the Punjab, north of Lahore, in the Bundelcund district, in Dacca, and in the Jumno-Gangetic Doab; near Agra, Delhi, Benares; in Scinde, in Oude, and on the coast of Ava. In all these various localities, the reports of the experiments are records of a succession of failures. Sometimes the blame is laid on the soil being too rich, and sometimes on being too poor; the climate of some stations is too moist, and of others too dry; while in a few cases, when good crops have been produced, the ravages of insects have destroyed the hopes of the cultivators. It is true that results of a more promising kind have been obtained in Tinnevelly, Guzerat, and some other districts; but the general unsuitableness of the Indian climate for the American species of cotton-plant is established by the vast majority of the experiments. The reason of this unsuitableness is clearly explained in Dr. Royle's remarks on the irrigation of crops in dry soils otherwise favorable:—

"The great difficulty in applying irrigation to cotton in India, is, that you have to deal with a plant which has been raised in the rainy season, and which necessarily has all the habits of one accustomed to moisture both of soil and climate. And yet it is one of which you must check the luxuriant growth if you wish to have a sufficient production of flowers and fruit. This is done naturally in most plants by the heat and dryness of summer, and in Egypt, where cotton is copiously irrigated, by the dryness of the climate. But in cultivating American cotton in India, you have a moist-weather plant—that is, one with short roots and broad leaves, exposed suddenly to dryness, when, from the clearness of the sky, and the heat of the sun, there must necessarily be copious evaporation. The Indian species, which is a moisture-

and drought-enduring plant, withstands both the suddenness and the violence of the changes; but then it only produces a short-stapled, woolly cotton."

Whatever, therefore, may be the result of judicious culture in special localities, the prospects of obtaining a large supply of American cotton of Indian growth are very doubtful. But it is certain that native Indian cotton might be obtained of a quality and at a price to compete with a large proportion of the American cotton. Though short in staple, and not easily spun by machines suited to American cotton, the natives contrive to spin it into the finest yarns. In strength, durability, and other good qualities, it is well adapted for at least one-half of the manufactures in this country—that is, for all yarns under No. 20. Indian cotton of this quality could always be sold with profit in Liverpool at $3\frac{3}{4}d.$ a pound. The cost of production and of carriage is not the hindrance to a large and regular supply. But the uncertainty of price in the English market, determined by that of American cotton, prevents the steady increase of Indian culture and commerce. When the difference between the two cottons is $\frac{3}{4}d.$ or $1d.$ a pound, the spinners of No. 20 yarn will give the larger sum for American cotton, on account of the waste from the inferior condition of the Indian cotton. It is to the improvement of the quality and state of the Indian cotton that attention ought to be first of all directed. Since it can now be sold for a profit in Liverpool, at $3\frac{3}{4}d.$ a pound, there is a wide margin for improving the quality so as to secure a demand in the market. It must be admitted that little can be done at present towards improved culture. This can only be effected by the slow influence of European or American overseers superintending the roots, and by the stimulus of a higher price offered for a better article. But there are other causes which depress the value of Indian cotton in the market. It is carelessly collected, carelessly cleaned, carelessly housed, and carelessly packed. The middlemen who buy it from the ryots, fraudulently adulterate it to such a degree that one-fourth of the fair price is the usual deduction of a purchaser for estimated impurities. The ryots, naturally indolent, prefer the tolerably certain return for inferior and dirty cotton to the trouble and expense involved in having a

cleaner cotton ready for the agents when they come round to purchase.

The carelessness of the cultivators and the fraud of the agents will not be diminished till European colonization is increased, but meanwhile a great step might be taken by the merchants at the Presidencies examining the cotton, (as the Government does the opium,) regulating the price by the quality, and refusing such produce as degrades Indian cotton in the home market. That good and clean cotton can be obtained by those who deal directly with the producers is evident by the East India Company's Thomil cotton in former times being of this nature, agents sending dirty cotton not being paid their commission. The Dharwar and Candeish cotton, bought up and cleaned in recent experiments, sold well, and we have the testimony of Mr. Turner and Messrs. Clarke in this country, and of Mr. Landon in India, that Surat cotton, when brought to market in a clean state, is fit for spinning No. 40 yarns. The most effective and cheapest way of securing general improvement would, therefore, appear to be in the first instance for Chambers of Commerce or manufacturers to establish agencies at the places of export, whose firm dealing with the native agents would compel the supply of a cleaner cotton. When English planters multiply and English machinery is at work in the interior, there will be little difficulty in increasing the produce, and sending it to market in a state fit to compete with ordinary American Uplands cotton. Until the cotton can be cleaned and prepared on the spot, for transmission by the river and rail conveyance that will hereafter open up Indian commerce, the main hope of improvement must rest on the interference by European agents with the wakarias, chettys, and other middlemen, whose exactions and frauds have disgraced this branch of Indian commerce. The general results of Dr. Royle's inquiries may be thus briefly stated:—First, the climate of India is, on the whole, unsuitable to the successful culture of the American species of cotton-plant; secondly, the native Indian cotton may be brought to the English market at a price and in a condition to supply regularly half the demand of the manufacturers; thirdly, the hindrances to the increase of profitable Indian cotton commerce arise chiefly from the demand and price being dependent on the greater or smaller crops of America, the manufac-

turer never using Indian cotton when they can get American cotton cheap; fourthly, by arranging for the purchase of the produce directly from the cultivators, or by establishing agencies at the places of export to control the native middlemen, the Indian cotton might be obtained in a condition that would secure for it a better reputation and price than it now commands,—local agencies would be, of course, preferable, as likely to obtain for the cultivators a share of the benefit now intercepted by the extortionate middlemen; fifthly with increased security to property under a firm Government, and with improved cultivation, superintendence, machinery, and modes of conveyance, the quantity and quality of Indian cotton may be made such as to render its regular and remunerative commerce quite independent of the crops of other countries. Thus, by the ordinary course of commercial enterprise, there will never be occasion for having recourse to "protection" by imposing a duty on cotton from other than British possessions—an expedient which Dr. Royle justly describes as admissible only as a last resort for encouraging Indian culture and commerce.—*London Pharm. Jour., April*, 1858, *from Times, March* 11th.

ON ARSENIC IN PAPER-HANGINGS.

By F. A. Abel,

Director of the Chemical Establishment of the War Department.

The experiments performed by Mr. Dugald Campbell with paper-hangings containing arsenic, which were described in the last number of the *Pharmaceutical Journal*, are similar to a series which I have just completed, having been induced to undertake them at the time Dr. Halley's letter on the subject appeared in the *Times*, in consequence of repeated appeals for my opinion on the necessity of removing arsenical paper-hangings from apartments. As these experiments have been varied so as to fulfil every condition presumed to be favorable to the volatilization of arsenic from paper-hangings, and have been carried on for much longer periods than those of Mr. Campbell, I venture to hope that a brief description of them will not be uninteresting.

Two experiments were made, in the first instance, in a room

of which the walls were covered with paper hangings, exhibiting a large pattern of a light green color. The surface of the paper was not glazed, and the colored portions were found to have on their surface about two-tenths of a grain of arsenic per square inch. In the first experiment the room was kept thoroughly closed for about thirty six hours; a portion of its atmospheric contents were then drawn, by an aspirator, first through a solution of nitrate of silver, and then through a tube containing asbestos moistened with ammonio-nitrate of silver. In the second experiment, air was passed through these tests for a longer period than in the first (about five hours), and three gaslights had previously been kept burning in the well-closed room for several hours. Not a trace of arsenic was detected by a careful examination of the tests at the close of these experiments.

3rd Experiment.—A large glass tube (3 feet 3 inches in length, and 2 inches in diameter) was next filled with slips of arsenical paper-hangings, placed in a small room, in a position where it could be raised to a temperature of about 90° F., and connected with a similar apparatus to that employed in the former experiments, containing solutions of nitrate and ammonio-nitrate of silver. Air was then drawn through the apparatus uninterruptedly for one week (by means of a *Johnston's Aspirator*), three gaslights being kept burning in the closed room, at intervals, for several hours. The air passed through the apparatus at the rate of one cubic foot in two hours.

4th Experiment.—Air was passed through the apparatus, as before, for twenty-four hours; the tube containing the paper was kept warm, and the air was made to pass through a strong solution of sulphurous acid before it reached the tube.

5th Experiment.—The end of the tube at which the air entered was connected with a large funnel suspended immediately over a burning gas-jet; hot air, mingled with the products of the combustion of gas, was thus made to pass over the paper for three days.

6th Experiment.—The fifth experiment was repeated, the air being passed uninterruptedly for four days.

7th Experiment.—Hot air was passed through the tube, as in the fifth and sixth experiments, for nine days, the colored surface of the arsenical paper having first been thoroughly roughened by friction, so as to promote the mechanical detach-

ment of the arsenical pigment by the current of air, and to favor to the greatest extent the possible volatilization of arsenic. It should be mentioned, that in all these experiments the tube connecting the test apparatus with the large tube which contained the paper was plugged with cotton wool, to prevent any particles of the pigment from being mechanically carried over into the test-solutions.

8th Experiment.—Strips of arsenical paper-hangings were pasted together, back to back, with paste in a state of decomposition. Air, collected over the gas-flame, was passed over this paper for a period of nine days; the tube containing the paper was not heated until after the second day.

Not a trace of arsenic was detected in the solutions in any one of these experiments, neither were any arsenical particles carried away mechanically by the air as it swept over the paper, as was proved by a careful chemical examination, after each experiment, of the plug cotton wool above referred to.

In order to furnish indisputable proof that the green arsenical color employed in the manufacture of paper-hangings is not affected by air, even when in a finely-divided and perfectly unprotected condition, 600 grains of finely-powdered emerald green were uniformly dispersed through a quantity of cotton wool, sufficient to fill compactly a tall jar of about a half-gallon capacity. A tube, connected with the test apparatus, and plugged with cotton wool, was passed to the bottom of the jar, and air was drawn through the apparatus continuously for one week, the jar which contained the emerald green being maintained at 90° F. during a portion of the time. Not a trace of arsenic was found to have been volatilized at the conclusion of this experiment.

It may, I think, be very safely concluded from the experiments detailed above, added to those performed by Mr. Campbell, that the possibility of injurious consequences resulting from the employment of paper-hangings colored with arsenical pigments has been disproved; and that the symptoms which have been described as exhibited by persons who happened to occupy rooms hung with such paper-hangings, can only be regarded as accidentally connected with that circumstance, and are ascribable to other causes.—*London Pharm. Journ.*, *May*, 1858.

ON MYCOSE, THE SUGAR OF ERGOT OF RYE.

By Prof. Mitscherlich.

By extracting ergot of rye with ether, boiling it with alcohol, evaporating the alcoholic solution, dissolving the residue in water, evaporating these solutions to the thickness of an extract, and leaving them to stand for a long time, Wiggers obtained crystals which he declared to be a peculiar sugar. Perhaps Pettenkofer had already obtained these crystals, and regarded them as phosphate of morphia. Wiggers gave some of these crystals to Liebig and Pelouze, who analyzed them; from his description and their analyses, made with a portion which was not quite pure, they concluded that these crystals were mannite. As the form of some crystals which the author obtained from Wiggers was different from that of mannite and the other known sugars, he prepared this sugar in considerable quantity, when its peculiarity was confirmed, and as it stands in close relation to the other substances of the saccharine group, and when its properties are better known will certainly be found more abundantly than is the case with mannite and inosite, it was submitted to an accurate examination.

This sugar is best obtained when the ergot is finely powdered and extracted with water; the filtered fluid is precipitated with basic acetate of lead, with which the sugar gives no precipitate, the excess of oxide of lead is removed from the filtered fluid by sulphuretted hydrogen, and the fluid is evaporated to the consistence of a syrup in the water-bath. If a sample leaves a residue when dissolved in water, the whole is again dissolved, filtered, and evaporated; the concentrated fluid is allowed to stand for a long time, when crystals are formed in it, and when their quantity no longer increases, the adherent fluid is removed by washing with alcohol, in which the sugar is insoluble. By repeated solution in water and crystallization, the crystals are obtained colorless and transparent, with smooth, readily measurable surfaces, and of a remarkable lustre, when the sugar is dissolved in boiling dilute alcohol, and the solution is left to cool. 2 kilogrammes of ergot gave 2 grms. of sugar; the ergot of 1856 gave no sugar in repeated experiments with variation of the processes; in one case mannite was obtained, but in this

year scarcely any ergot could be collected, as hardly any was formed in consequence of the season being so favorable for the development of the rye.

The crystals have a sweet taste, and are very soluble in water; no crystals separate on the cooling of an aqueous solution containing 50 per cent. of sugar. In alcohol they are almost entirely insoluble; boiling alcohol dissolves less than one hundredth part of its weight, and most of the portion dissolved crystallizes on cooling. In ether they are insoluble.

A solution of the crystals is not precipitated by solutions of baryta and lime. When dissolved in a concentrated solution of soda and boiled therewith, the solution did not become in the least brown, even when it was exposed for several hours to a temperature of 212° F., nor did any perceptible change take place.

If the solution of the crystals be mixed with soda and sulphate of copper, a deep blue solution is obtained, which does not lose its color or deposit any protoxide of copper, a very slight deposit of protoxide of copper took place only when it had been exposed for several hours to a temperature of 212° F.

In the first hydrate of nitric acid the sugar dissolves with a very inconsiderable evolution of heat; water separates from the solution a sticky mass, which is insoluble in water, but readily soluble in alcohol and ether; on the evaporation of the alcohol or ether, the dissolved matter is left again in the sticky state. When heated, this body first of all melts, and then becomes decomposed with incandescence and slight detonation. If the sugar be boiled with ordinary nitric acid, it is decomposed, with formation of oxalic acid. Towards nitric acid, alkalies and sulphate of copper, therefore, this sugar behaves like cane-sugar.

In fuming, as in ordinary sulphuric acid, it dissolves without decomposition; the solution is colorless, but when it is heated to 212° F., a decomposition takes place, with production of a strong brown color.

During crystallization the solvent fluid exerts a great influence upon the development of the crystals of this sugar, as upon similar sugars, such as sorbine; from an aqueous solution it is usually obtained with curved faces; but from a solution containing alcohol, with very beautiful smooth faces. The author has

already called attention to this fact on several occasions, and indeed first with regard to the acid phosphate and arseniate of potash, which are obtained with smooth faces from a solution containing a little neutral salt; with a slight excess of acid, the inclination of the secondary plans towards one another becomes more obtuse, by as much as 1°, and with a greater excess the faces become so curved that they are no longer measurable.

The form of the crystals is a regular octahedron. When exposed for a long time to a temperature of 212° F., in a water-bath, the sugar fuses into a perfectly transparent fluid, which becomes glassy on cooling, and only grows crystalline after a considerable time; at the same time it gives off but little water, which was undoubtedly only enclosed mechanically. Heated to 266° F., in the zinc-bath, it gives off much water, and becomes inflated; at last it again becomes solid, and even when strongly heated gives off no more water; at 410° F., the hard, vesicular mass fuses, becomes brown when a little more strongly heated, and at the same time evolves an odor of caramel. Sugar that has been heated to this temperature dissolves in water with a brown color, and its solutions, evaporated in the air, furnishes crystals of unaltered sugar, with which some uncrystallizable sugar is mixed. When exposed to a higher temperature, it is completely decomposed; a spongy coal remains, which burns without residue in the air. At 212° F., it loses 9·62 per cent. The analysis gave,—

C	38·37	12	38·09
H	6·87	11	6·88
O	54·76	11	55·02

Of water of crystallization it would contain 2 atoms = 9·52 per cent. so that the sugar would consist of $C^{12} H^{11} O^{11} + 2HO$.

0.7485 grms. of the sugar was dissolved in a little water, the solution poured into a glass bottle, which displaced 7·463 grms. of water, and the bottle was filled with water. The fluid weighed 7·7310 grms. so that it had a spec, grav. of 1·036; this solution therefore contained 9.68 per cent. or 10·03 grms. of sugar in 100 cub. centims. When put into a tube 200 millims. in length, this solution rotated the plane of polarization by 34¾° to the right; the same quantity of cane-sugar effects a rotation

of $13\frac{1}{3}°$, and the same quantity of dextrine one of $29\frac{1}{3}°$; so that this sugar causes a greater rotation than any other compound of this group.

When this solution was diluted with water, mixed with about 10 per cent. of sulphuric acid, and evaporated in the water-bath to a little more than its former specific gravity, its rotatory power had undergone no change; when mixed with potash and oxide of copper, and heated, a sample gave no reduction of oxide of copper; when boiled strongly for half an hour, the rotation diminished by about 13°, and a sample mixed with potash and sulphate of copper, and boiled, effected a partial reduction of the peroxide to protoxide; when boiled for several hours, so much concentrated that a slight brown tint was produced, it rotated the plane of polarization about 10°. In these experiments the samples taken out were included in the calculation, and the same measure of fluid was always employed. This rotation nearly agrees with that of a solution of starch-sugar of corresponding strength.

After the sulphuric acid had been got rid of with carbonate of baryta, and the filtered, evaporated fluid had been set aside for a considerable time, it solidified almost completely into verrucose crystals, the solution of which was set in fermentation by yeast as quickly as starch-sugar. By long boiling with dilute sulphuric acid, therefore, the sugar of ergot is converted into starch-sugar.

As this sugar occurs in a fungus (μύκης), and belongs to the group of cellulose, glycose, and dulcose, the name *mycose* appears to be the most suitable.—*Chem. Gaz., April*, 1858, *from Dericht der Akad. der Wiss. zu Berlin*, 1857.

ON SAPONIN.

By M. Von Payr.

In his investigation of the seeds of the Horse-chestnut, Rochleder found a beautifully crystallized, colorless, silvery substance, which forms a principal constituent of the seeds, inasmuch as the other non-crystalline constituents stand in a very simple relation to it. This substance is a conjugate compound, giving products of decomposition with alkalies and acids, which stand

in a remarkable and simple relation to chinovic acid. It thus became necessary to examine again saponin and caincic acid, which has the same percentage composition as the substance from the seeds of the Horse-chestnut, and also chinovic acid. The author has undertaken the investigation of saponin, and has obtained from it, by the action of potash, a beautifully crystallized acid, together with an amorphous substance, which latter is again decomposed by muriatic acid into two products. The experiments of Schnedermann are completely confirmed, and all uncertainty which could not be got rid of either by Rochleder and Schwarz, or by the persevering researches of Belley, entirely disappears.—*Chem. Gaz., April*, 1858, *from Sitzungsber. der Akad. der Wiss. zu Wien.*

TEST FOR CINCHONA BARK AND ITS ALKALOIDS.

Owing to the difficulty of distinguishing between cinchona bark and other barks substituted for it, in cases where it is not possible to extract the bases and examine them, Hr. Grahe has endeavored to obtain some means of determining this point readily. He finds that true cinchona bark, when submitted to dry distillation, gives a product of a bright carmine color. This product is characteristic of these barks, and is not furnished by any others that do not contain the cinchona alkaloids. The quantity of this red substance depends upon the amount of the alkaloids, and it appears to afford a tolerable indication of this amount. The test is applied by heating a fragment of the bark weighing about five or ten grains, in an ordinary test tube, and gradually raising the heat to redness. With cinchona bark a whitish smoke is given off, and also water vapor, which condenses on the sides of the tube. Very shortly afterwards the red color begins to appear, communicating to the vapor a reddish tinge, and at about one inch distant from the heated portion of the tube there is deposited a red pulverulent film, which gradually passes into a thick oleaginous liquid, running down the glass in drops or streaks of a fine carmine color in the water condensed with it. Close to this point are deposited the tarry products generally resulting from the destructive distillation of vegetable substances.

The following varieties of bark were tested in this way. They were all about ten years old, and had been well preserved. The names given are those proposed by Wiggers. Peeled and unpeeled *china regia plana*, *ch. regia convoluta*, *ch. de Quito rubra plana* and *convoluta*, *ch. de Bogota*, *ch. huanuco plana* and *convoluta*, *ch. pitayo*, *ch. de Quito flava*, *ch. de cusco vera*, *ch. de Carthagena lignosa*, *ch. aurantiaca canaliculata*, *ch. Maracaïbo*, *ch. Humalies*, *ch. Loxa vera* and *myricans*, and *ch. Jaen nigricans*. All these yielded the red substance, and even in the case of those barks containing but small amounts of alkaloids, the reaction was distinct and unmistakable. Only in the case of *ch. Jaen albida* it could not be recognized. But the existence of alkaloids in this bark is not by any means certain, and is denied by some.

True cinchona bark from which the alkaloids had been previously extracted by acids, and false cinchona barks, did not yield the red substance. This was also the case with some other kinds of officinal bark that were examined for the sake of comparison. Thus, for instance, *c. angustura*, *c. cassiæ*, *c. Frangulæ*, *c. copallia*, *c. geoffroyæ jamaicensis* and *surenamensis*, *c. juglandis*, *c. pruni padi*, *c. quercus*, *c. rhamni cath*, *c. salicis*, *c. ulmi*, and *c. winteranus*.

The presence of some substances prevents the production of the red substance, even in the case of true cinchona bark. Among these are caustic alkalies, lime, nitric and chromic acids, bichromate of potash, glacial phosphoric acid, and sulphuric acid.

In order to determine what constituent of the bark yielded this red substance, quinine, cinchonine, quinidine, and cinchonidine were severally and collectively submitted to destructive distillation, but they did not in any case furnish the red substance.

Quinoidine, that was probably impure, gave a faint and only transient red coloration. Neither kinic acid nor the tannic acid of cinchona gave any reaction. But any one or all the alkaloids gave the reaction when heated with one or two drops of acetic acid for each grain of the alkaloid. This was also the case when the alkaloids were heated with kinic acid or with the tannic acid of the cinchona bark, and when heated with citric, tartaric, valerianic, butyric, or tannic acids. Cinchonine, quinidine, and cinchonidine, when heated with acids, did not give the

reaction immediately, perhaps, because these alkaloids sublime readily, but the reaction is always produced eventually when the sublimate melts and runs back again into the heated portion of the tube.

Sulphate of quinine, or any of the cinchona bases mixed with sulphuric acid, are instantaneously colored red when heated, but the color soon disappears again, owing to the energetic action of the acid.

Since strychnine yields leucoline when distilled with caustic alkali in the same manner as the cinchona alkaloids, an experiment was made with this alkaloid also, but no red coloration was produced either when it was heated alone or with acids. The same result was obtained with aconitine, atropine, berberine, brucine, emetine, gentianine, morphine, narcotine, salicine, and theine.

These experiments lead Hr. Grahe to infer that the production of this red substance, when the cinchona bases are heated together with organic acids, is a reaction characteristic of them.

With regard to the nature of the product thus obtained, it is, as might be expected, very complicated. The red oleaginous substance is always accompanied by an acid watery liquid, and has a peculiar aromatic and empyreumatic odor, like that of leucoline and that of the cinchona barks combined. When the red substance is left in contact with the air, it becomes brownish-red. Its taste is bitter, burning, and like that of pepper. It is lighter than water, to which it communicates a slight taste and smell, but without appearing to dissolve. It is soluble in alcohol, and water precipitates from such solution a soft dark-colored resin.—*London Pharm. Jour.*, *May*, 1858.

ON A METHOD OF OBTAINING GLUE FROM CERTAIN KINDS OF LEATHER.

By John Stenhouse, L.L.D., F.R.S.

When the thinner kinds of ordinary leather, such as are used to form the upper portions of boots and shoes, and for similar purposes, are reduced to fine shreds, and then boiled in a Papin's digester, at a pressure of about two atmospheres, for three hours, with 20 per cent. of powdered chalk, or 15 per cent. of hydrate

of lime, and a considerable quantity of water, the leather is almost entirely decomposed; its tannic acid combining with the lime forms an insoluble precipitate, and the gelatine dissolving in the water forms a pretty concentrated solution, which on evaporation yields an excellent glue.

The glue obtained by this process amounts to about 25 per cent., but varying considerably; sometimes as much as 36 per cent. has been obtained, at other times as little as 15 per cent., operating, of course, on different parcels of leather; the reason of these variations will speedily be apparent.

It was naturally to have been expected that the thicker kinds of leather, such as those employed for the soles of shoes and similar purposes, would, when digested with chalk under pressure, have undergone a similar decomposition; this, however, was found not to be the case, as this species of leather, however minutely divided, yielded little more than traces of glue, and this was the case even when caustic baryta was employed. It is evident, therefore, that the thicker kinds of leather have a very different constitution from that of the lighter varieties, and are in fact different substances. This diversity in constitution probably arises from changes which the thick leather undergoes in the tan-pit, where it is usually kept from six to eighteen months, while the tanning of the thinner kinds of leather is usually completed in a few weeks. This singular metamorphosis, which the thick leather undergoes during the long-continued maceration with tannin to which it is subjected, explains the reason why the numerous attempts which have been made to shorten the length of the tanning process for thick leather have all been unsuccessful, the quality of the leather, as is well known, being deteriorated exactly in proportion as the tanning process was shortened; the leather produced by these quick processes being of a uniformly soft and spongy character, long-continued exposure in the tan-pit being essential to the formation of the altered, dense variety of leather. Even the lighter varieties of leather, which have been quickly tanned, when long kept, say for ten or twelve years, appear to undergo a similar modification, so that when digested under pressure with lime, they yield but very small quantities of glue. This alteration appears to take place more rapidly when the leather is exposed to air and moisture; the leather, under

these circumstances, loses much of its flexibility; hence the quantity of glue obtained from old boots and shoes is very inconsiderable.

As I thought it not improbable that the animal portion of the leather might have undergone decomposition by losing a portion of its nitrogen, various kinds of leather were subjected to ultimate analysis, but, as will be seen from the subjoined results, the leather appeared to have merely undergone a metamorphosis by a new arrangement of its molecules without any of its nitrogen being eliminated.

New Thick— I. 0.185 gramme gave 0.346 CO_2, 0.099 HO, and 0.002 ash
0.152 do. do. 0.102 Pt.
II. 0.255 do. do. 0.475 CO_2, 0.130 HO, and 0.0025 ash

New Thin— I. 0.056 gramme gave 0.098 CO_2, 0.028 HO, and 0.0015 ash
0.012 do. do. 0.059 Pt.
II. 0.075 do. do. 0.132 CO_2, 0.035 HO, and 0.002 ash
0.198 do. do. 0.113 Pt.

Old Thin— I. 0.115 gramme gave 0.21 CO_2, 0.06 HO, and 0.002 ash
0.241 do. do. 0.154 Pt.
II. 0,1725 do. do. 0.315 CO_2, 0.085 HO, and 0.0025 ash
0.195 do. do. 0.123 Pt.

	NEW THICK.			NEW THIN.			OLD THIN.		
	I.	II.	Mean.	I.	II.	Mean.	I.	II.	Mean
Carbon.....	50.81	50.58		46.67	48.00		49.73	49.79	
Hydrogen.....	5.94	5.64		5.53	5.17		5.21	5.15	
Oxygen.....									
Nitrogen	9.52	9.21		8.25	8.12		9.12	9.00	
Ash.....	1.08	1.00		2.67	2.66		1.73	1.75	

Though the decompositon of leather under pressure by lime is no doubt interesting in a scientific point of view, I fear it is not likely to be an economical process, as even the thinner kinds of leather have a considerable value, being worth about twopence per pound.

In conclusion, I may remark, that the only practical improvement of importance which has been made upon the process of tanning for many years, is that which is technically called "handling" the hides. This consists in frequently withdrawing the hides from the tan-pit, and allowing them to get partially dried; in this way the exhausted solutions of tan are in a great

measure withdrawn from the hides, and on their re-immersion in the tan-pit, the tanning proceeds with increased rapidity. The effect of these operations through the influence of air and moisture, probably greatly facilitates the production of the denser variety of leather.—*London Pharm. Journ., Aug.*, 1857.

REMARKS ON THE DECOCTUM ALOES COMPOSITUM.

By Israel J. Grahame.

Read before the College, February 4th, 1858.

Although this is not an officinal of the U. S. P., it is occasionally prescribed by our physicians, and its preparation in accordance with correct principles, and in a manner that will present a mixture of uniform and elegant appearance, is a desideratum to every pharmaceutist. As made by the formulæ of the British Colleges, in all of which it is officinal, the Aloes, Myrrh, Saffron, Liquorice and Carbonate of Potassa, are boiled together with the water for a considerable time, and to the strained decoction thus obtained, the Compound Tincture of Cardamom is added.

By this process, while the virtues of the Aloes are very much impaired by the long boiling, and much insoluble extractive formed, the aromatic qualities of both the Saffron and Myrrh are nearly dissipated; and the result is a very turbid looking decoction, which continues to deposit long after the mixture is completed; and it is very doubtful whether the clear liquid produced after sufficient repose, possesses any of the purgative quality of the Aloes; the amount of this principle contained in it, is at all events very small. Consequent upon this, is the necessity of administering the medicine in large and nauseating doses, if the purgative effect is desired to be produced.

Considered apart from its therapeutic value, the inelegant appearance of the compound thus made and dispensed from our establishments, renders a change of formula desirable.

In view of these facts, I offer the following formula for its preparation, as more in accordance with the objects sought in the compound; and would also suggest the term "Mistura

Aloes Composita," for adoption in the place of "Decoctum Aloes Compositum."

MISTURA ALOES COMPOSITA.

Take of Extract of Liquorice, ...	½ ounce.
Liquorice Root (in moderately fine powder,)	1½ ounces.
Carbonate of Potassa, ...	1 drachm.
Aloes, Myrrh,* and Saffron, (each in moderately fine powder,) each .	1½ drachms.
Compound Tincture of Cardamom, .	6½ fluid ozs.
Distilled Water, ...	18 " "

Rub well together the Aloes, Myrrh and Carbonate of Potassa,—add the remaining powder, and mix all intimately. Having mixed the water and Compound Tincture of Cardamom, pour of this liquid on the compound powder, sufficient to dampen it,—pack moderately in a suitable displacer; and having placed over the surface a piece of perforated filtering paper, pour on the remainder of the liquid, and when it has ceased to pass, add water sufficient to make the filtrate measure in all twenty-four fluid ounces.

As thus prepared, the Compound Mixture of Aloes is a clear, rich, reddish brown liquid, possessing in a marked degree the characteristic properties of the compound.—*Journ. and Trans. of the Maryland Coll. of Pharm., June*, 1858.

BRONZE POWDER.

Hr. König has made some experiments, with the view of ascertaining the mode of preparing bronze powder, which is generally kept secret. The specimens he examined were those known commercially as—

1. Pale yellow. 2. Yellow. 3. Reddish yellow. 4. Orange. 5. Copper red. 6. Violet. 7. Green. 8. White.

The bronze powders 1, 2, 3, 4, 6 and 7, were found to consist of copper and zinc, with traces of iron. 3, 4, 6 and 7 contained a small amount of oxydized copper, the surface of the particles being covered with suboxide of copper. This is shown by the action of acids; for when the powder was covered with dilute

*The finest pieces of Myrrh in lump should be selected.

sulphuric or hydrochloric acid, the color immediately disappears, owing to the solution of the thin layer of suboxide, and the proper color of the alloy appears. The amount of oxygen could not be estimated in any of these bronzes, but it did not amount to one-thousandth. The bronze powder called white, contains zinc and tin. The bronzes 3—7 were also found to contain a minute quantity of fat, which, on dissolving the powder in dilute acid, separated upon the surface of the liquid in the form of a thin film.

The quantitative analysis of the alloys gave the following results:—

	Copper.	Zinc.	Iron.	Tin.	Remarks.
1. Pale yellow, .	82.33	16.69	0.16	—	
2. Yellow, . . .	84.50	15.30	0.07	—	Fine golden yellow
3. Reddish yellow	90.00	2.60	0.20	—	Brass yellow, with a shade of red
4. Orange, . .	98.93	0.73	0.08	—	The color of clean copper that has been heated
5. Copper red, .	99.90	—	trace		Copper color, with a shade of purple
6. Violet, . . .	98.22	0.50	0.30	trace	Purple violet
7. Green, . . .	84.32	15.02	0.03	trace	Bright bluish-green,
8. White, . . .	—	2.39	0.56	56.46	Between tin white and lead grey

These results show that bronzes of the most different colors possess nearly the same composition. The action of acid shows, likewise, that their color is owing to different degrees of oxydation. It appears therefore probable, that in the preparation of bronze powders a certain alloy is used for all, and that the colors are produced by heating to different temperatures. This Hr. König found to be the case. In his experiments with the above-named powders, No. 1, when heated, presented successively all the prismatic colors, and acquired a fine dark violet. Most of the other bronzes presented the same character, and when the heat was maintained, lastly became black, from complete oxydation.

Hr. König is of opinion that the fat in these bronze powders originates from the use of fat in their preparation, for the purpose of ensuring uniform temperatures. Tallow or fat oils

would not answer for this purpose, since they would in course of time cause an oxydation of the copper. Wax, and especially paraffine, appear better adapted for this purpose. He states that 0.5 per cent. of either substance, mixed with the bronze powder in a shallow pan, is sufficient.

The mechanical subdivision of the alloy is effected by rolling and hammering, as in the preparation of gold leaf, and then grinding the leaves of metal with water, between stones.

Hr. König has endeavored to prepare these bronzes in the wet way, by reducing the metal, but has not succeeded in obtaining any satisfactory results. The only substance of this kind which he was able to prepare in the wet way, is that called "iron black," which is used for coating gypsum figures, in order to give an appearance similar to grey cast iron. This consists of very finely divided antimony, precipitated from solution by means of zinc.—*London Pharm. Journ., Aug.*, 1857.

ACIDUM PHOSPHORICUM DILUTUM.

To the Editor of the Pharmaceutical Journal.

Sir,—Without being able of my own knowledge to answer the query of Mr. Whipple, I gladly seize an opportunity of saying something respecting the preparation of Acidum Phosphoricum Dilutum, P.L.; but in order to be somewhat relevant, will first quote from M. Personne's original paper (*Journ. de Ph. et de Ch., tome* 32, Oct. 1851) some paragraphs bearing on the question of the poisonous or non-poisonous action of phosphorous acid.

M. Personne begins by saying that his communication is not for the purpose of describing red phosphorus, already so fully described by Schroetter, but of making known certain facts that had escaped that able chemist, and at the same time of proving that the highly poisonous action attributed to (PO_3 by Wœhler and Frerichs is far from being so well founded as those chemists appear to think.

He proceeds to show that red phosphorus, even after very careful purification, is, like the ordinary variety, attacked by atmospheric oxygen, and converted into (PO_3) and PO_5), but very slowly; the action, moreover, being the more rapid, the more finely-divided the phosphorus.

But red phosphorus had been proved to be destitute of poisonous action, and this innocuity had been ascribed to its non-oxydation.

This latter assumption being now proved to be incorrect, "it is important to solve the question by direct experiments, that can leave not the least doubt of the poisonous action or innocuity of phosphorous acid. For this purpose I have given to dogs quantities of phosphorous acid, varying from 0.6 grm. to 1.45 grm. of the supposed anhydrous acid. Six dogs have been employed in these trials; in all the dogs, the œsophagus has been tied after the injection of the diluted acid into the stomach, and, to my great astonishment, these animals have all of them lived six, eight, or even nine days after the injection of the pretended poison. I will add, that for each of these six experiments, I have employed a phosphorous acid proceeding from a special operation, and the quantities of acid have been, for greater exactitude, tested by means of the transformation of the perchloride of mercury into protochloride, according to the following æquation:

$$PO_3 + 4\,Hg\,Cl + 2\,HO = PO_5 + 2\,(Hg_2Cl) + 2\,H\,Cl.$$

"The acid that has served for these experiments has always been obtained by the decomposition of protochloride of phosphorus by water, and the evaporation of the acid liquor over lime in an exhausted receiver."

The eventual death of the dogs is accounted for by "their prolonged abstinence," and "the results of the injuries consequent on tying their œsophagus."

The point I mainly wish to insist on, is the great advantage of adopting M. Personne's suggestion, that red phosphorus, in fine division, is, from the readiness with which it is attacked by dilute nitric acid, exceedingly well adapted for the preparation of tribasic phosphoric acid.

I have always been annoyed by the tediousness of the P. L. process, and have sometimes been unfortunate in either breaking apparatus or burning my fingers; and not having been able hitherto to devise a better process, I gladly adopted the idea of M. Personne, and attempted its preparation, using the exact quantities prescribed in the London Pharmacopœia.

On pouring, however, the acid on the phosphorus, I observed an immediate sense of warmth, and I had only just time to transfer the mixture to a large jug, and carry it into the open air, before very rapid chemical action commenced, with evolution of red nitrous fumes.

When the reaction had almost ceased, the mixture was transferred to a basin, and a gentle heat applied until the nitric acid was exhausted, and a syrupy acid obtained.

When tested with nitrate of silver, it revealed abundance of phosphorous acid; which was oxydized to (PO_5) by the addition of nitric acid equal to about one-third of the quantity originally taken.

This large loss may be in part prevented by using the nitric acid diluted by three instead of two parts of water. The action then proceeds quietly, and no red vapors are eliminated. The action nearly ceases when about half the phosphorus is dissolved. (The solution then contains, besides (PO_5) and PO_3), what I believe to be (PO) hypophosphorous acid, the presence of which is indicated by a white precipitate with nitrate of silver, passing into black on the application of heat.) It is finished by the application of heat, and the addition of one-fourth the original quantity of nitric acid, or sufficient to raise all the oxides to (PO_5). I think this extra expense of nitric acid is amply compensated for by the absence of personal danger, and the saving in glass retorts and condensers, whose occasional fracture cannot be avoided in the old process.

Hoping these remarks may prove useful to my brethren,

I am, Sir, your obedient servant,

THOMAS B. GROVES, F.C.S.

Weymouth, March 18th, 1858.

AFRICAN SENNA.

Mr. Bentley exhibited to the meeting a sample of senna from Africa, which had been given to him by Dr. Livingstone, the celebrated African traveller. He thought that such a specimen was, at the present time, of much interest, as an expedition was about to start for the exploration of the Zambesi river, with a view of ascertaining the nature of the vegetable and mineral

productions of the countries which were traversed by it; and as senna grew in great abundance in these regions, they might become one of the principal sources of our supply of that important drug. This senna resembled in its characters that of ordinary East Indian, and was therefore, no doubt, derived from the same or a nearly allied species of *Cassia*. Mr. Bentley thought it was of great advantage to be able to obtain our supplies of senna from several districts, as, by so doing, we prevented, in a great measure, its extensive adulteration at any particular one, as was formerly the case, especially with Alexandrian senna. He said that the latter kind of senna had much improved of late years, but it was still, at times, much adulterated. The improvement which had taken place was entirely due to the exposure of its systematic adulteration some years since by the Pharmaceutical Society, and this example might be mentioned as one of the many successful results of the Society's operations in checking the adulteration of drugs.—*Trans. Pharm. Society, from London Pharm. Jour., April*, 1858.

NOTE ON A DRUG CALLED ROYAL SALEP.

By Daniel Hanbury.

Among some specimens of Materia Medica from Bombay, for which I am indebted to the kindness of the late Dr. J. E. Stocks, is one which was received under the designation of *Badshah Saleb* or *King Salep*. The specimen being a solitary one, and no information respecting it, beyond that conveyed by its name, having reached me, it remained almost unnoticed until within the last few months, when an original package, containing about 100 lbs. of an unknown and un-named drug from Bombay, was offered for sale in the London market. Upon seeing samples of this drug, I recognized it as *Badshah Saleb;* and having obtained from this source a more abundant supply, I have been able, to some extent, to investigate it, and the results of that investigation I will now detail.

In the first place, the name *Badshah Saleb* is partly Persian and partly Arabic,—*Badshah* being the Persian for *King*, and *Saleb* the Arabic original of our word *Salep*. The term may therefore be rendered *King Salep* or *Royal Salep;* and it has

doubtless been applied on account of the drug being regarded as Salep of pre-eminently large size. That it is in reality very distinct from true Salep—in fact, that it is not a *tuber*, but a *bulb*—was pointed out to me by my friend Dr. Lindley, who has further suggested its botanical origin. I will, however, first describe the drug as met with in commerce.

Royal Salep consists of dried bulbs, whose dimensions from base to apex vary from 1¼ to 2 inches. The largest specimen weighs 730 grains: the average weight, taking twenty bulbs, was found to be 337 grains. Allowing for considerable irregularity occasioned by drying, the form of the dried bulbs may be described as usually nearly spherical, sometimes ovoid or even oblong, always pointed at the upper extremity, and having at the lower either a depressed cicatrix, or frequently a large, white, elevated, scar-like mark. Their surface is striated longitudinally, besides which there is mostly one broad and deep furrow running in the same direction. They are usually translucent, transmitted light showing them to be of an orange-brown; by reflected light they are seen to vary from a yellowish brown to a deep purplish hue—sometimes shaded at the base into an opaque yellowish white.

In substance the bulbs are dense and horny: they may be cut with a knife, but can hardly be powdered. After several hours' maceration in water, they become soft, opaque, and of a slaty or purplish hue, and increase greatly in volume, regaining in fact their natural size and form. If in this state a bulb be cut longitudinally into two equal portions, its distinctness from an orchis tuber will be at once manifest. Instead of the homogeneous, fleshy mass of the latter, we find a single fleshy envelope or scale of excessive thickness, whose edges overlap each other; this scale surrounding an elongated, flattened bud.

Although this single convolute scale is all that remains in the dried bulb, it is supposed by Dr. Lindley that other scales external to it have been stripped off previous to drying.

Of the plant affording *Royal Salep*, and of its place of growth, nothing appears to be known. I have not been able to discover any notice of the drug in the works of Kæmpfer, Forskal, Ainslie, Roxburgh, Royle, or O'Shaughnessy. Honigberger, in speaking of the sorts of Salep used at Lahore, mentions one resembling a

dried fig, which I suppose may be the drug under notice, but he gives no account of it. Dr. Lindley's examination of the bulb leads him to the opinion that it is possibly that of some species of Tulip, of which there are four known to occur in Affghanistan. *Tulipa Oculus-solis* (St. Amans) and some other species, when grown in favorable localities, certainly produce very large bulbs, which have, moreover, but few scales; but I am ignorant of any having a scale of such enormous thickness as that seen in the drug under notice. It is obvious, however, that the question of botanical origin cannot be determined from our limited materials.

Upon the uses of *Badshah Saleb*, I can say very little: from the bulb being mucilaginous and saccharine, I presume it may answer some of the purposes for which orchideous tubers are valued. At the same time it has a bitterish and slightly acrid taste, that quite unfits it as a substitute for Salep in this country. The decoction of *Badshah Saleb* is far less mucilaginous than that of true Salep: it is not rendered blue by the addition of a solution of iodine.

Mr. Bentley said that the bulbs now described by Mr. Hanbury, under the name of "Royal Salep," closely resembled some that were imported a few years since, mixed with sumbul root. The latter had the same general appearance externally, and contained in their interior a central bud, which was enveloped by a solitary fleshy scale of great thickness. The chief distinction between the bulbs was apparently in the odor of the two respectively, for those which were mixed with sumbul were strongly alliaceous, while in the royal salep bulbs no such odor could be distinctly traced, although he thought there was some faint evidence of such an odor. He thought it probable, therefore, that the royal salep would prove to be the bulb of a species of *Allium*, rather than that of a *Tulipa*. Mr. Bentley said that the bulbs, by keeping, had lost the translucency and yellowish-brown color which they had at first possessed, and become opaque, and of a much darker hue.—*London Pharm. Jour., April*, 1858.

ON THE PREPARATION OF MEL DESPUMATUM.

By Charles Caspari.

The quality of honey brought into the market being frequently of a very dissimilar character, it will sometimes happen, that one

method of preparing the above named article will yield a good result from a certain quality, and be without any effect at all, upon trial of another. Among the many ways proposed for the preparation of Mel Despumatum, the following process, to judge from various scrutinous experiments, appears to promise the most favorable result:—

Mohr recommends to treat the honey under process of refinement, with a solution of tannin, or an infusion of nutgalls, which, with some kinds of honey, will be found very practicable; in other cases, however, it will not produce a clear solution. The application of tannin will work in this way: by heating, it will coagulate with the gelatine contained in the honey; and the turbid substances will separate with the coagulum.

In some instances, however, clarification will not take place, and this will invariably be the case with the better, and consequently purer qualities of honey, which contain too little gelatine to effect, with the tannin added, a coagulum. Now, to effect the desired result, I proceeded in the following manner:—

I dissolved twenty ounces of honey in double the quantity of water, and added to this turbid solution twenty-four grains of gelatine dissolved in a few ounces of water. To this fluid, after being well mixed, I added seven grains of tannin previously dissolved in a little water; the whole was then again well stirred and exposed to the heat of a steam or sand bath. It was then set aside until cold, when I added the white of two eggs beaten into a good lather, and then finally boiled it up once or twice on an open fire, which effected a perfect coagulation of the turbid slimy matter. The fluid should now be strained through a woolen cloth, and poured back, until it runs bright and clear, or it can be filtered through thick blotting paper. It should be reduced, by evaporation, to twenty ounces.—*Journ. and Trans., Maryland Col. Pharm., June*, 1858.

ON SPURIOUS LEMON-JUICE.

By H. Sugden Evans.

The chairman next introduced the subject of the quality of lemon juice supplied to emigrant and other ships sailing from the

port of Liverpool. He had had occasion to make analyses of several samples, and found a great number of them spurious imitations of the genuine juice, being composed of a solution of tartaric acid in water, fortified by oil of vitrol and flavored with essence of lemon. The following are the results of the analysis of several samples of pure and spurious lemon juice by Mr. Evans:—

PURE MESSINA LEMON JUICE.

	I.	II.	III.	IV.	V.
Citric Acid	12.77	4.35	7.04	9.56	7.50
Alcohol	0.00	2.28	2.07	3.08	2.75
Earthy Salts	.34	.45	.40	.37	} 89.75
Extractive	.16	.13	.23	.23	
Water	86.73	92.79	90.26	86.76	
	100.00	100.00	100.00	100.00	100.00

SPURIOUS JUICE.

	I.	II.	III.	IV.
Tartaric Acid	2.91	2.04	2.65	4.5
Sulphuric Acid	.09	.13	.12	Trace.
Water, Extractive, &c	97.00	97.83	97.23	95.5
	100.00	100.00	100.00	100.00

By this means a cheap substitute was obtained, but differing most essentially from lemon juice, which should not contain a particle of tartaric or free sulphuric acid, and which, alone, can be relied on as a *preventive* to scurvy. He had been informed, on reliable authority, that very large quantities of these spurious compounds were annually consumed, being supplied at prices far below those at which genuine juice could be imported. He thought, however, the whole of the blame did not rest with the dealers—the public is equally blamable, being so much actuated by a love of cheapness; and he proposed, as a remedy, that the authorities should insist upon an analysis being provided with each sample, and, whenever the fraud is discovered, enforcing the penalty provided by the Merchant Shipping Act. There could be no excuse for the omission of this very plain duty, as the process of testing is so simple and inexpensive.—*Trans. Liverpool Chemists' Asso., in Pharm. Journ., April*, 1858.

ON SOME CONSTITUENTS OF RHUBARB.

By WARREN DE LA RUE, PH.D., F. R. S., TREAS. C. S., AND HUGO MULLER, PH.D.

I.—*Investigation of a Deposit found in Tincture of Rhubarb.*

It has been often observed, that when freshly prepared tincture of rhubarb is left to itself for some time, it becomes turbid, and deposits a dark-colored precipitate, which cannot be redissolved, either by heating the tincture or by diluting it with fresh alcohol. The attention of the Society was recently called to this circumstance by Mr. Whipple, who frequently has occasion to prepare the tincture of rhubarb on a large scale: Mr. Whipple, at the same time, gave an account of a few experiments he had made with the precipitate, and stated that his leisure did not permit of his investigating the subject further, but that he would furnish material to any member who might feel inclined to pursue the inquiry. As it appeared to be very probable, that the deposit from the *tinctura rhei* contained some constituents of interest, we availed ourselves of Mr. Whipple's offer; and we take this opportunity to express to him our thanks for the liberal supply of material which he kindly placed at our disposal.

The deposit from rhubarb tincture is of a dark color, and resinous nature; it resembles logwood extract coarsely powdered, and has in a slight degree the characteristic odor of rhubarb. When heated in a test-tube, it does not melt, but gives off yellow fumes, which condense to a yellow liquid, a black residue being left. Heated on platinum foil, it burns without melting, leaving a tolerably large quantity of ash, which consists principally of potash and lime. Boiled with water, it imparts a yellowish tint to it, but an almost inappreciable quantity of it is dissolved: alcohol, when boiled with the precipitate, assumes a dark yellow-brown tint, but the quantity dissolved is, nevertheless very small. Similar results are obtained on treating the precipitate with ether, chloroform, and glacial acetic acid. Ammonia and concentrated sulphuric acid dissolve the greater part, but not the whole of the substance; the fixed alkalies, on the other hand, when aided by heat, completely dissolve it, with the exception of a slight residue, consisting of accidental impurities: the solution in ammonia, the alkalies, or sulphuric acid, is of a dark, dingy purple color.

After having determined the leading properties of the deposit by the above-named experiments, its composition was investigated in the following manner:—A considerable quantity of the substance was pulverized as finely as possible, and treated repeatedly with boiling spirit of wine (of 86 per cent.) until it no longer dissolved anything; the insoluble residue, which constituted by far the greater bulk of the deposit, will be treated of hereafter. The dark yellow solution was filtered while hot, and concentrated by partially distilling off the alcohol; the concentrated solution, on cooling, deposited a flocculent matter of a yellow color. This deposit, after being several times dissolved in alcohol, and allowed to deposit therefrom, became crystalline, and exhibited all the properties of *Chrysophane.*

In accordance with the method adopted by Schlossberger and Döpping,* in their analysis of rhubarb, the mother-liquor of the chrysophane was mixed with about an equal volume of ether, when a bulky brown precipitate was formed. This was allowed to stand for a while, and the clear supernatant liquor tested with a fresh portion of ether, in order to ascertain whether any more precipitate could be thrown down. After the precipitation was ascertained to be complete, the deposit was separated by filtration, and set aside. The filtrate was concentrated by distilling off the greater part of the ether, and was then allowed to evaporate spontaneously to dryness. The dry residue was again dissolved in alcohol, and the solution treated with ether, which again caused a precipitation; the filtered solution was then concentrated, and allowed to evaporate to dryness; and these operations were repeated as long as ether caused any precipitate in the alcoholic solution. Lastly, by evaporating the alcoholic solution to dryness, we obtained a small quantity of a substance which did not show any signs of crystallization; it had a brown resin-like appearance, and when powdered became yellow; it dissolved readily, with a turmeric tint, in alcohol, ether, and benzol, and gave a deep red solution with ammonia and the fixed alkalies, and exhibited the other characteristic properties of *Erythroretin.*

The brown deposit separated by ether from the solution of erythroretin, after repeated solution in alcohol and precipitation

* *Ann. Ch. Pharm.* 1., 219.

with ether, resembles in all its properties the *Phœoretin* of Schlossberger and Döpping.

It will be recollected that we stated that the greater part of the deposit from the tincture of rhubarb, when treated with alcohol to remove chrysophane, erythroretin, and phæoretin, remained undissolved; by digesting this residue with a moderately strong solution of caustic potash, it dissolved completely, giving a dark brownish-red solution. To the alkaline solution hydrochloric acid was added; this caused the separation of a deep brown precipitate, which was first washed with water, then with alcohol, to remove a portion of phæoretin which it still contained. After drying, the precipitate formed an almost black resinous substance, nearly insoluble in alcohol, ether, chloroform, and benzol; but dissolving readily in the alkalies. When heated on a platinum foil, it takes fire without melting. These properties accord with those of the *Aporetin* of Schlossberger and Döpping.

These experiments tend to show that the deposit which forms in the tincture of rhubarb is composed chiefly of chrysophane, erythroretin, phæoretin, aporetin; the chief constituents being the last named. The chrysophane amounts to about 4 per cent., and hence the rhubarb-tincture deposit is a valuable material for its preparation.—*London Pharm. Jour., May*, 1858.

[To be continued.]

ON THE MATERIALS USED FOR CLOTHES.

By M. Coulier.

The subject of this work was proposed to me M. Michel Levy, who has likewise aided me by advice which has been very valuable to me.

In my experiments I used exclusively the materials worn by soldiers. These materials are of linen, cotton, and variously colored cloth. I have successively considered these fabrics as protective agents—1st, against cold; 2nd, against heat; and 3rd, as bodies destined to absorb the products of the cutaneous excretions. With respect to this last question, my experiments have led me to consider that when water penetrates a fabric in sufficient quantities, it is divided into two distinct portions which I shall call *hygrometric water* and *water of interposition*. The

following considerations have sufficiently proved the correctness of this distinction : 1st. Hygrometric water may be absorbed in considerable quantities without modifying the principal physical properties of the fabric; it can be discovered only with the balance. Water of interposition, on the contrary, powerfully modifies these same properties, and may be perceived by the touch. 2nd. Hygrometric water can only be removed by pressure; its weight will not cause it to descend into the lower portions of the stuff; this effect will be produced with water of interposition. 3rd. Water of interposition will always evaporate completely when the material is placed in an atmosphere which is not saturated with vapor. Hygrometric water, on the contrary, only evaporates entirely in a perfectly dry medium. Its weight varies with the hygrometric state of the surrounding atmosphere and the temperature of the fabric.

To estimate the hygrometric water and the water of interposition, the fabric must be weighed after being twenty-four hours over quick lime, and then over water; the material being put into the bell-glass, either dry, or saturated with water by having been steeped in it for some time. The difference of the weight will at once furnish the desired results. The average quantities of hygrometric water absorbed have been as follows: cotton, 0.10 of the weight of the fabrics; linen, 0·15; wool, 0·18 to 0·20. For water of interposition I obtained the numbers: linen, 0·5; cotton, 0·8 to 0·9; wool, 1·5.

I have ascertained that when a fabric removes as hygrometric water the liquid which moistens any surface with which it is in contact, the temperature of the latter does not vary. The water passes off, it is true, in the gaseous state; but, by condensing immediately in the pores of the fabric, it restores the heat absorbed to the latent state.

The conclusions which I have drawn from my investigations are as follows:—

1.—The color of the dress has no sensible influence on the loss of heat.

2.—All fabrics are capable of absorbing in the latent state a certain quantity of hygrometric water; this quantity, which is very considerable with wool, is less with linen and especially with cotton.

3.—This absorption takes place without causing any immediate loss of caloric from the human body.

4.—The color of the dress has a great influence on the absorption of solar heat, and a modification of the external surface is sufficient to give all the advantages which white fabrics present in hot climates whatever be the nature of the material itself.—*London Chemist*, from *Comptes Rendus*, Dec., 1857.

FORMULA FOR MAKING A SYRUP OF PHOSPHATE OF IRON AND AMMONIA.

By Joseph Roberts.

Read before the College, March 4th, 1858.

Take of	Sulphate of Iron, - -	278 grains.
	Phosphate of Soda, - -	359 "
	Glacial Phosphoric Acid, -	396 "
	Liquor Ammoniæ, - -	q. s.
	Sugar, - - - -	5½ ounces.
	Water, - - - - -	q. s.

Dissolve the phosphate of soda and the sulphate of iron separately, mix the solutions, and wash well the resulting phosphate of iron. Then to one-half of the phosphoric acid dissolved in one ounce of water, add liquor ammonia until it is saturated. To the other half of the phosphoric acid dissolved in a like quantity of water, add the moist phosphate of iron, and dissolve by a gentle heat. Then add the solution of phosphate of ammonia and the sugar, and evaporate to seven fluid ounces.

This gives a syrup containing thirty-six grains of phosphate of iron, thirty-eight grains of phosphate of ammonia, and twenty-eight grains of phosphoric acid to the fluid ounce, or 4½ grains of the iron salt, 4¾ grains of the ammoniacal salt, and 3½ grains of the acid to the teaspoonful.

The preparation seems to be a stable one, but whether it be a chemical compound in which the iron and ammoniacal salts exist as a double phosphate of iron and ammonia, or whether the mixture be merely mechanical, I am not prepared to say—but this I feel confident of, that the addition of the phosphate of ammonia to the solution of the soluble phosphate of iron, adds greatly

to the stability of the salt, and seems to counteract, in a remarkable degree, its proneness to pass into its insoluble state.

Of the therapeutic value of the preparation, of course, I can say nothing, but merely offer it as a syrup, holding in solution a large amount of phosphatic salt.—*Journ. and Trans. Maryland Col. Pharm., June*, 1858.

ON COLLODION.

By Charles Caspari.

Read before the College, December 3d, 1857.

Collodion cotton may be prepared either by treating cotton in a mixture of nitrate of potash and sulphuric acid, or with a mixture of nitric and sulphuric acids. By using nitrate of potash and sulphuric acid, I obtained a good preparation of collodion cotton after the following method:

Thirty-one parts of sulphuric acid of 1.83 sp. gr. to be well mixed in a glass cylinder with twenty parts of pulverized nitrate of potash. After the mixture has cooled to 110° F., one part of cotton freed of all impurities is mixed with it, and allowed to stand for about 36 or 40 hours, in a temperature of 75 to 80° F. For removing the acid and sulphate of potash, the cotton thus prepared must be well washed several times with cold water, and afterwards hot water poured upon it, to remove all sulphate of potash, which is retained very obstinately by the fibres of the cotton.

This cotton, after being strongly pressed and almost freed of its humidity by pressing between blotting paper, will easily dissolve in a mixture of ether and alcohol.

For preparing collodion cotton with nitric and sulphuric acids, I availed myself of one or the other of the two following processes:

13 parts of Sulphuric Acid of 1.64 sp. gr., and
12 parts of Nitric Acid of 1.48 to 1.50 sp. gr.,
or 14 to 16 parts of Sulphuric Acid 1.83 sp. gr.,
and 12 parts of Nitric Acid of 1.43 sp. gr.

The acids being mixed in a glass cylinder covered with a plate of glass, and the mixture cooled to 40° F., the cotton is stirred

into it, and left standing for about 36 or 40 hours at a temperature of 45 to 50° F. The cotton is now well washed with cold water and pressed between folds of blotting paper, to remove as much of the humidity as possible. This cotton dissolves very quickly in a mixture of ether and alcohol. Freshly prepared collodion cotton, as long as it is damp, will dissolve quicker and better than old, which is quite dry. If the cotton is left too short a time in the acid mixture, it gives a preparation not entirely soluble in the ether mixture; on the contrary, a longer standing with the acid mixture has never proved injurious, either to the dissolving or other qualities of the cotton. I obtained an excellent preparation, entirely and quite easily dissolving in the ether mixture, by leaving the cotton for nine days in the mixture of nitric and sulphuric acids.

Whenever the acids are too strong or not strong enough, the cotton will not dissolve in the ether mixture. By using strong fuming Nordhausen sulphuric acid of 1.86 sp. gr. mixed with nitric acid, or with nitrate of potash, the cotton is converted into a very excellent gun cotton, but being insoluble in ether, it cannot be used for collodion. Both collodion and gun cottons can be kept for any length of time without being decomposed, if proper care has been taken to remove all the acid by washing freely with water.—*Journ. and Trans. Maryland Col. Pharm., June*, 1858.

Baltimore, December, 1857.

ON THE PREPARATION OF SAVIN CERATE, AND THE FLUID EXTRACT OF SAVIN.

By I. J. Grahame.

Read before the College, March 5th, 1857.

The formulæ of the several Pharmacopœias for the preparation of *Savin Cerate* are all more or less objectionable. That of our own Pharmacopiœa, while it produces a tolerably efficient ointment, rendered so to a great extent by the employment of *Resin Cerate* as the fatty base of its composition, is an inelegant preparation on account of the use of the powder of *Savin* in a state of incorporation; to obtain which, in the requisite degree of division, it is necessary to be submitted to the drying process,

whereby a great portion of its activity is dissipated independent of the further liability of it being sometimes used in coarse powder.

On the other hand, the London Pharmacopœia directs the ointment to be prepared by infusing the fresh leaves in melted lard and wax—the *Edinburgh* by boiling the leaves in the fatty matter, and the *Dublin* by incorporating the powder with simple ointment.

From the nature of the composition of Savin, depending as it does upon volatile oil for its activity, it must be evident that in all those cases, where much heat is employed, the resulting ointment will be deficient in this constituent. I would, therefore, suggest the following formula as a substitute for that of the Pharmacopœia:—

Take of Lard,	7½	ounces.
Resin,	1½	"
Yellow Wax,	3	"
Fluid Extract of Savin,	2	"

Melt together the Lard, Resin and Wax, and when nearly cool, having stirred it constantly, add the fluid extract, and continue the stirring to completion.

For the preparation of the *Fluid Extract of Savin*, the following mode is proposed:

Take of English Savin, in fine powder, prepared from recently Dried leaves by contusion, . . . 4 ounces.
Alcohol (about 90 per cent.) . . q. s.

Pour on the Savin sufficient alcohol to dampen the powder, (ten drachms.) Pack immediately in a suitable displacer, with considerable pressure, and having placed on the surface a piece of perforated paper, pour on the alcohol, and when six fluid ounces shall have passed, put aside for spontaneous evaporation until reduced to three fluid ounces—stirring frequently, meanwhile, facilitates the process. Continue the addition of the alcohol until eight fluid ounces more pass; reduce this by water-bath at a moderate temperature to one fluid ounce, and mix it with the previous three fluid ounces.—*Jour. and Trans. of Maryland College of Pharm., June* 1858.

Varieties.

On Santonate of Quinia and Cinchonia. By M. Pavesi.—It is well known that santonin is a substance analogous to the fatty acids, and allied in a certain extent to the volatile oils, without acid reaction, but forming with bases (potassa, soda, magnesia, baryta) salts which crystallize. This is the case also with the alkaloids quinia and cinchonia. The author takes to make the latter salts, pure santonin, and pure cinchonia (or quinia), each 12½ drachms, ivory black 2½ drachms, alcohol 36° B., 2 pounds (avoir.), boil them together in a small alembic for a few minutes, filter the solution through paper, and distil at a moderate heat in a water-bath till reduced to 25 ounces. It is then removed from the fire to a cool place and left for 24 hours, that the santonate of cinchonia may crystallize. It is then removed to a filter, and the crystals dried after drainage.—*Revue Pharmaceutique*, 1857, *Dorvault.*

Nitrous Fumigating Powder.—Take of bi-sulphate of potassa 15 parts, nitrate of potassa 13 parts. Pulverize the substances, mix them well and add a sufficient quantity of oxide of manganese to blacken the mixture.

In using this powder it is thrown pinch by pinch on a hot brick. Immediately abundant vapors of nitric and hyponitric acids are disengaged. —*Revue Pharmaceutique*, 1857.

Ferrated Protein.—This compound has recently been employed in France. It is obtained by coagulating the albumen of eggs by means of nitric acid, washing the coagulum with very dilute muratic acid 1 part to 100, till all soluble matter is removed, then dissolving it in a solution of caustic potassa, containing 1 part in a 100, at the temperature of 122° Fahr. The albumen thus dissolved, is then precipitated again by strong acetic acid and the coagulum washed with distilled water till it ceases to contain acetate of potash, and is then dried in a stove. Thus prepared it is white, tasteless, and odorless, and readily attracts moisture from the air and should be preserved in close bottles.

Ferrated protein is obtained by triturating together equal parts of this powder and iron by hydrogen. It should be kept closely bottled, as it attracts moisture, which rapidly oxidizes the iron. The dose is from 2 to 5 grains daily for an adult.—*Revue Pharmaceutique*, 1857.

New Remedy for Consumption.—Ergot of rye, or spurred rye, has received the approval of the Academy of Medicine at Turin, as one of the most

active remedies for consumption. Dr. Parola, the author, describes its action as infallible, if not in curing the disease, at least in staying the pulmonary inflammation which constantly accompanies the formation of the tubercle. He administers thirty-one grains of the powder per day, and suspends it every four or five days for forty-eight hours. When the stomach is too weak, the resinous extract may be administered in pills instead of the powder, to the amount of one and a quarter grains, or else a portion in a solution of gum. Quinine, foxglove, and even opium, may sometimes be administered together with it. By this treatment Dr. Parola has cured sixteen cases out of thirty-one of alleged confirmed consumption in an advanced stage.—*Scientific American.*

Sulphurous Acid.—The application of this acid to manufactures has been much impeded by the difficulty which the preparation of its solution presents on a large scale; for the production of sulphurous acid, as given in books, is always dangerous, especially when its solution has to be prepared in large quantities. This difficulty I have overcome by a process which I here give to the public, and which enables me to prepare thousands of gallons per day of a saturated solution. The process consists in burning sulphur in a small furnace, and conducting the acid gas through earthenware tubes, surrounded with water, so as to cool them. It is then made to ascend through a wooden column, forty feet high, and about four feet wide, filled with pumice-stone which has been previously washed with muratic acid, and then with water. Whilst the acid ascends through the porous pumice-stone, it meets a certain and known quantity of water descending, which dissolves the acid. By opening, more or less, a valve at the top of the column, a more or less rapid current is established. With a little care, a saturated solution runs out constantly from the bottom of the column into a confined reservoir, in which it is stored for use until required.

I was led to contrive the above process from a wish to use sulphurous acid in sugar refining, convinced that it would be far superior to the sulphate of lime (which was so strongly recommended a few years ago by M. Dumas and M. Melsens), because, that by its volatility it would not remain in the syrups or molasses, and give them, as the sulphate does, a disagreeable taste, in consequence of the lime of the sulphate remaining in the syrup as acetate or lactate. These anticipations were not only realized, but I also found that sulphurous acid possesses two advantages for the sugar refiner: First, that it stops the fermentation of his hot liquors as they come out of the filters; and secondly, when properly applied, it tends to prevent the re-coloration of the liquors during their concentration in the vacuum pan. In practice I found that very successful results were obtained by adding two gallons of a saturated solution of sulphurous acid to every one hundred gallons of decolorized liquor, as it left the char-filter, and was collected in tanks, until pumped up or run into the vacuum pan.—*Professor F. Crace Calvert, in Scientific American.*

On a new Method of obtaining Carbonate of Potash from Felspar and similar Minerals. By Dr. E. Meyer.—The author's process consists essentially in decomposing the mineral by calcination with lime, and then treating it with water under a pressure of 7 to 8 atmospheres. With felspar 14 to 19 equivs. of lime are used to 1 equiv. of felspar, or to 100 parts of felspar 139 to 188 parts of lime.

The lime is employed either as hydrate or in the form of chalk; it is intimately mixed with the felspar to a plastic mass, which is made into round balls of 3 to 4 inches in diameter, slowly dried, and then exposed to a temperature between a bright red and a white heat. The temperature must be so high, that the mass, after burning, may contain neither carbonate of lime nor uncombined caustic lime. It should therefore exhibit a very inconsiderable elevation of temperature with water. It is usually caked together. Of course, for such a decomposition a very intimate mixture of the felspar and lime is requisite. The more lime employed, the shorter the time necessary. After burning, the mass is powdered and heated with water in a vessel capable of bearing a pressure of 8 atmospheres, in which the decomposition is completed in 2 to 4 hours. The solution above the powder (which is never firmly solidified, as the formation of steam probably prevents cohesion) is caustic to the touch, is free from hydrate of lime, and always contains all the soda, and potash to the amount of about 9 to 11 per cent. of the weight of the felspar employed.

A second extraction of the powder freed from the solution of potash is of no great use; little potash, but plenty of lime is dissolved; the latter cannot be taken up by the solution in the first instance. It is of no great advantage to continue the extraction longer than 4 hours.

If the alkaline solution, after saturation with carbonic acid, be evaporated to dryness, a little alumina and silica separate first of all; the carbonate of soda then crystallizes, and at last carbonate of potash remains, which, when pure minerals are employed, is perfectly free from other acids.

As regards the mass remaining insoluble in water, the very intimate mixture of its constituents renders it peculiarly suitable for the preparation of a Portland cement, the composition of which varies within the same limits. These cements, however, sometimes contain more alumina. This want of alumina, if it be a defect at all, is easily supplied by the addition of a little clay, with which the residue need only be mixed. The author has found, however, that the powder taken out of the kettle, and again strongly calcined, sets very rapidly and firmly under water, so that the addition of clay is unnecessary.

As a matter of course this mode of preparation will not be applied exclusively to pure felspar, as other felspar or minerals containing potash, must also be adapted for this purpose. Thus, for example, there are many granites which contain about 7 per cent. of potash, and from which the

manufacture of potash would appear to be remunerative. Of course, in this case, the chemical composition is to be taken into consideration, and the amount of lime added to be modified accordingly. All that has to be done is to establish the proportion of 3 or 4 equivs. of base to 1 equiv. of acid, in which potash, soda, lithia, lime, and magnesia are to be regarded as bases; and silica, alumina, and oxide of iron as acids. Any chlorine or fluorine that may exist has no influence; and magnesia, instead of being injurious, has been found to be preferable to lime for the separation of potash. Moreover, it is well known that mica, which would play an important part when granite is employed, is far more easily decomposed than felspar, for, as Mitscherlich has lately discovered, it is even completely decomposed by muriatic acid in a glass tube at 212° F.

The points to be observed in carrying out this process on a large scale are now to be referred to; these, however, may easily require modification by local and other circumstances.

As the abundant result in potash depends especially upon the complete decomposition of the felspar, and the latter can only be effected by a very intimate mixture with lime, the greatest attention is to be paid to the fine division of the substances to be employed, in order that in the intermixture the portions of felspar may be in contact with the lime in many places. The felspar, or the mineral containing felspar (of course, only granites with a small proportion of quartz will be operated on), is burnt in a furnace which works uninterruptedly, or in any reverberatory furnace, taken out of the fire whilst still red-hot and thrown into water. By this treatment it will be split in every direction, and rendered sufficiently soft for further division. It is then powdered under stampers or between cast-iron crushing rollers, and afterwards ground with water upon mill-stones. The bottom stone and the runner must be of quartz or granite, and possess considerable weight. The finely ground powder is then passed through sieves into the lixiviating apparatus, very finely lixiviated, and conducted into pits to settle. It is of the greatest importance only to employ fine lixiviated powder in the manufacture, as this greatly facilitates and hastens the decomposition by ignition, and causes a saving in fuel. The time occupied in lixiviation is not so considerable, as it might appear at the first glance, as the rule adopted in the porcelain factories is not to be applied here. The greater specific gravity of the felspar causes it to settle far more rapidly than clay; it is unnecessary, as in porcelain factories, to bestow great care on purity, on the exclusion of dust, iron, &c., so that the simplest arrangement is sufficient for the purpose. The coarser powder is, of course, ground again.

A similar fine division is required for the lime, and when this is employed in the burnt state, it is most completely effected by slaking. Nevertheless, when circumstances admit of the employment of carbonate of lime, the latter is to be preferred, because the balls or cakes prepared with it

shrink less in drying, and retain more cohesion and solidity in the fire. In this case, of course, lixiviation is necessary.

In any case the lime and felspar must be in a state of the finest division before they are mixed together. The author does not think it necessary to say anything about the proportionate weights beyond what has been already stated; it is impossible to give any definite numbers, as they would be different for each raw material, for which reason a preliminary analysis is necessary. So much lime must always be added, that 3 or 4 equivs. of base may be presented to 1 equiv. of acid. It is to be observed, however, that as the materials are obtained in the form of a fine mud, the amount of moisture in them must be determined, when the proper quantities may be arranged by measure upon this basis. Measuring in this way is more exact and convenient than weighing.

The intimate mixture of the materials is most conveniently effected by means of a clay-mill, the usefulness of which is now well known. The paste is allowed to pass through until it is perfectly homogeneous. As soon as this is the case, the mixture issuing from the clay-mill is cut by the machine itself into cylindrical pieces of 5 to 6 inches in length, and 2 to 2½ inches in diameter. These are slowly dried, and then put in the furnace to be burnt.

The best furnace for burning the mass is the porcelain furnace, because a more uniform heat can be attained in all parts of it than in the ordinary tile-furnaces. The latter may, however, be employed. A blast-furnace with a permanent blast would also be suitable, although inequalities of temperature are very liable to occur in it in different parts. The porcelain furnaces may be 2 or 3 stages high, and be furnished with 4 or 6 charges. Any fuel may be used, as the ashes carried on by the draught cannot produce the same injury here as in the burning of porcelain. The necessary temperature is a bright red heat, but it should be ascertained for each material by some preliminary trial burnings, as the greater or less degree of fusibility plays an important part, and fusion is not necessary. The cylinders contract considerably by burning, and are partly broken up. They are ground, and then mixed with water in the steam-kettle, in which the decomposition is to take place.

For the sake of simplicity and easy management, several kettles are heated by the steam of one generator. It is then unnecessary to moderate the fire during the emptying of the kettles, but the refrigeration necessary for emptying and filling them may be produced by simply shutting off the steam. A double bottom is also unnecessary, as a solidification of the mass and consequent overheating of the wall of the kettle cannot take place. The powder is put into the kettle by a suitable arrangement; the necessary quantity of water is let in, and then the connexion with the steam-generator is established. Fluid may be drawn off by a cock, to ascertain the quantity of alkali dissolved. When the decomposition is completed, the solution

is allowed to flow out into clearing vessels by the pressure of the steam. When the suspended pulverulent mass has settled, the supernatant lye is conducted into the evaporating pans. The powder remaining in the kettle is cleaned out, and new masses immediately introduced, so that the working of the kettle is continued uninterruptedly. The lye, which contains caustic potash and soda, is either sold as such, or saturated with carbonic acid by passing the air of the fire over it, by which the evaporation is hastened at the same time. If the decomposition has been complete, no lime separates in this process, but only alumina and silica, which were dissolved in the caustic lime; this sediment is raked together and removed. During the subsequent cooling the carbonate of soda crystallizes, whilst the more soluble carbonate of potash is obtained by calcination. The carbonate of potash thus obtained is almost chemically pure, and far preferable to any prepared from the ashes of plants.

The powder taken out of the kettle and the clearing vessels, which may be again lixiviated to furnish a lye which may be employed afterwards instead of water, contains the constituents of a hydraulic cement. It is made into balls, or, by means of a clay-mill, into cylinders, either by itself, or with the addition of a little clay, and then burnt in a furnace. After burning, the pieces are pounded in the dry state, finely ground between granite rollers, and sifted; they then furnish a cement which resembles Portland cement in its composition, but far exceeds it in homogeneity.—*London Chem. Gaz., from Dingler's Polytechn. Journ.*

AMERICAN PHARMACEUTICAL ASSOCIATION.

The Seventh Annual Meeting of the "American Pharmaceutical Association," will be held in the city of Washington, D. C., on Third day, (Tuesday) the 14th day of September next at 3 o'clock P. M.

The objects of the Association and the conditions of membership are explained in the following extracts from the Constitution.

Article I.

"This Association shall be called the American Pharmaceutical Association. Its aim shall be to unite the educated and reputable Pharmaceutists and Druggists of the United States in the following objects:

1st. To improve and regulate the drug market, by preventing the importation of inferior, adulterated or deteriorated drugs, and by detecting and exposing home adulteration.

2d. To establish the relations between druggists, pharmaceutists, physicians and the people at large, upon just principles, which shall promote the public welfare and tend to mutual strength and advantage.

3d. To improve the science and the art of Pharmacy by diffusing scientific knowledge among apothecaries and druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4th. To regulate the system of apprenticeship and employment so as to pre-

vent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

5th. To suppress empyricism, and as much as possible to restrict the dispensing and sale of medicines to regularly educated druggists and apothecaries.

ARTICLE II.—*Of the Members.*

Section 1. Every pharmaceutist or druggist of good moral and professional standing, whether in business on his own account, retired from business or employed by another, who, after duly considering the objects of the Association and the obligations of this Constitution, is willing to subscribe to them, is eligible to membership.

Section 2. The mode of admission to membership shall be as follows: Any person eligible to membership may apply to any member of the Executive Committee, who shall report his application to the said Committee. If after investigating his claims they shall approve his election, they shall at the earliest time practicable report his name to the Association, and he may be elected by two-thirds of the members present, on ballot. Should an application occur in the recess, the members of the Committee may give their approval in writing, which, if unanimous, and endorsed by the President, shall constitute him a member, and the fact be reported to the Association at the next succeeding meeting.

Section 3. No person shall become a member of this Association until he shall have signed this Constitution, and paid his annual contribution for the current year. All persons who become members shall be considered as permanent members, but may be expelled for improper conduct by a vote of two-thirds of the members present at any annual meeting.

Section 4. Every member shall pay into the hands of the Treasurer the sum of two dollars as his yearly contribution, and is liable to lose his right of membership by neglecting to pay said contribution for three successive years. Members shall be entitled, on the payment of three dollars, to receive a certificate of membership signed by the President, Vice-Presidents and Secretary, covenanting to return the same to the proper officer on relinquishing their connection with the Association.

Section 5. Every local Pharmaceutical Association shall be entitled to five delegates in the annual meetings, who, if present, become members of the Association, on signing the Constitution, without being ballotted for.

Section 6. Pharmaceutists, Chemists, and other scientific men who may be thought worthy of the distinction, may be elected honorary members upon the same conditions and under the same rules as appertain to active members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office or to vote at the meetings.

Section 7. Members who have paid their annual contribution for ten successive years shall be considered life members, and exempt from their yearly payments, and entitled to a certificate to that effect.

CHARLES ELLIS, President.

Philadelphia, 6th mo. 20th, 1858,

Editorial Department.

MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION FOR 1858.—Our readers will observe at page 379 the official call of the next meeting of this body, to be held at Washington on the 14th of September next. The place of meeting fixed upon is the most southerly yet appointed, and it is hoped that our Southern friends will make an effort to be present, as heretofore the representation from the South has been very limited. As Pharmacy, like medicine, knows no sectionalism, save that which arises from earnest effort, and as for many reasons it will be advantageous to have the countenance and counsel of pharmaceutists in Southern localities, we hope they will be induced to attend the meeting at the National Capital. Of the subjects to be reported on and continued, those of domestic adulterations and the revision of the Pharmacopœia concern the apothecaries and druggists of every State, and on which almost every one may have something to say or communicate in writing. Of the Special Committees, many have interesting subjects to report on, and with even moderate diligence much valuable information may be developed. Apart from the legitimate objects of the meeting, the many interesting features of Washington and its vicinity, will doubtless have their weight in attracting members and others to attend.

SCHOOL OF PHARMACY.—The attention of druggists and apothecaries, and their assistants and apprentices, is requested to the advertisement of the School of Pharmacy in the appended sheet. Those who desire further information in regard to the school, may obtain it by addressing Prof. Robert Bridges, 20th street, near George street, Philada.

HOME ADULTERATIONS.—The Chairman of the Committee on this subject, appointed at the last meeting of the Association, has sent us the following notice, which deserves the attention of every one interested in the arrest of that great evil, the domestic adulteration of drugs and medicines. Facts of all kinds, bearing on the subject, will be acceptable to the Committee, and especially well authenticated instances of adulteration. What the Committee particularly want to know, is "what is adulterated? where? and by whom?" The Committee, it will be perceived, appeal to physicians as well as apothecaries. The physician sometimes has opportunities to discover adulterations through the inefficiency of medicines prescribed, and being pecuniarily disinterested, he may do much service to the cause by communicating with the Committee.

TO DRUGGISTS, APOTHECARIES AND PHYSICIANS.

The Committee on Home Adulterations hope to report to the next meeting of the Pharmaceutical Association, to be held in Washington in September,—and earnestly solicit *facts* from all interested upon the subject. Such

communications may be sent, *with samples*, if possible, to either member of the Committee, who will pay the expense of such transmission if required.

C. B. Guthrie, 88 John st., N. Y.
C. T. Carney, Boston.
Wm. Fiske, Cleveland, Ohio.
A. B. Taylor, Philadelphia.
A. P. Sharpe, Baltimore.

Fluid Extracts.—Occasionally, in our capacity as Editor, we are the recipient of specimens of pharmaceutical preparations, such as extracts, fluid extracts, etc., with a view to giving an expression in regard to their merits. It is very difficult to give an opinion on such matters, worth anything to the *consumer*, unless an amount of investigation is entered into that is inconvenient to an Editor, and often difficult to accomplish where the opinion is based, as it should be, on therapeutic observations by competent physicians. A proximate principle, as an article of manufacture, if pure, may be pronounced on by its merely chemical characters by a competent chemical examiner, it being assumed that the therapeutist has previously decided its merit in the scale of medicines. In galenical preparations, where but one formula exists, as regards proportional strength and modus operandi, a good pharmaceutist can generally give an opinion of value, based on sensible properties by comparison; but where each manufacturer has a process and often a proportion of his own, opinions become little more than guesses with a very doubtful degree of certainty. Besides, one uses sugar, another alcohol, and a third both, as the preservative agents, thus modifying the sensible properties of the preparations, and more or less masking the active principles.

It seems now pretty well established that fluid extracts, as a class, meet the favorable opinion of physicians, and it becomes a matter of grave importance to the medical profession that some efficient action be taken by the pharmaceutists of the United States to adopt a set of formulæ,—that is one for each class,—which shall govern the manufacturer, whether he be apothecary, druggist, or manufacturing pharmaceutist, as regards the proportion of the drug and the menstrua to be used in extraction and the agent for their preservation. With these points established, it is clear, that any marked differences in these preparations could be readily detected, and these differences would be attributed to inferiority of material or unskilful manipulation. These remarks have been called forth by the reception of some samples of fluid extracts from Henry Thayer & Co., of Cambridge, Massachusetts, accompanied by a circular, a price current, and a list of formulæ for making derivative preparations.

On a former occasion (Jan., 1856,) we alluded to the fact that the fluid extracts of this House were prepared with alcohol in lieu of sugar, but in saying so we had no intention of conveying the idea that these gentlemen appear to have drawn from our remarks, as exhibited in the following

quotation from their circular, viz. : "*We originated the class of extracts possessing the form of dense clear solutions*, credit for which is given us in the Journal of Pharmacy, for Jan., 1856," &c. The remarks upon which this assertion is based is as follows :—"A peculiarity of these extracts is that they all contain 20 per cent. of alcohol, as the means of preservation, whether made with that menstruum or not." "They may therefore be looked upon as concentrated tinctures, with about half the usual proportion of alcohol found in that class of medicines." Long before we had seen these preparations we had published recipes for alcoholic fluid extracts, as those of valerian, buchu, cimicifuga, etc.

The particular samples sent to us on this occasion, are the fluid extracts of Conium, Podophyllum, Jugland, Scillæ, Cinchona and Ipecac. So far as a careful inspection of their sensible properties goes, we believe them to be excellent in quality. In the podophyllum there is, after standing a month, some light brown sediment, supposed to be resin; and it is doubtful whether a menstruum so slightly alcoholic will retain this important ingredient in solution, unless aided by an alkali. The ipecac is so strongly marked in odor as to be readily recognised by smell alone. The butternut has the pungency of the bark well defined, and the conium possesses the peculiar odor of the recently dried plant, without any mousey smell of conia. The squill is a reddish-brown, thin, syrupy liquid, owing its consistence almost entirely to the soluble matter of the drug, and is a beautiful preparation. The extract of calisaya bark differs from that made by Mr. Taylor's formula in being transparent, it containing both sugar and alcohol; yet we observe a resinous looking deposit, showing that despite the alcohol, the cinchonic red will, as in the simple tincture, be slowly deposited.

We have some views in regard to the subject of manufacturing pharmacy, that might be well brought in here, but space and time admonish us to seek another occasion.

THE LIBRARY AND MUSEUM OF THE PHILADELPHIA COLLEGE OF PHARMACY. —Many of our readers are aware that in the night following the 9th of March last, the Hall of the Philadelphia College of Pharmacy was fired by an incendiary, in the lower hall, by igniting a mass of scientific journals gathered from the tables, which he had piled up against one of the cabinet cases. Fortunately the alarm was given early, but not until the entire contents of one of the cases was destroyed, and about half of another case including nearly all of the rare and valuable specimens from Dr. Royle, brought from London by Ellis Yarnall, Esq., of this city, and which were from the East India Company's contribution to the great exhibition of 1851. The library, on the opposite side of the room, suffered severely in the destruction of binding, and about fifty volumes accidentally in one of the cabinet cases were totally destroyed. The fire was entirely confined to the room where it originated, and owing to the judicious use of water by the firemen, the destruction of property, and especially of the books, was comparatively small. The heat was so intense as to blister the paint in all parts of

the room, even fifty feet from the fire, and to crack the glass in the windows and picture frames. No damage was done by water in either of the lecture rooms above. The loss was covered by insurance, but unfortunately the money cannot restore many of the valuable specimens from India. The committee on the cabinet and library are now engaged in their restoration as far as possible, and we would invite contributions of specimens and books from members and others who feel interested in the Institution.

Formulary of German Officinal Preparations not contained in, or differing from, Wood & Bache's Dispensatory. By F. F. MAYER, *Pharmaceutist.* Reprinted from the American Druggists' Circular and Chemical Gazette. New York: Henry Bridgeman: 1858; pp. 38, 24mo.

This little pamphlet will be found useful to many apothecaries, who do not possess the large works, as a reference for many of the non-officinal preparations that are sometimes prescribed by German and other physicians.

Journal and Transactions of the Maryland College of Pharmacy. Published by authority of that College Quarterly. Vol. 1, No. 1. Pp. 32.

It is with sincere pleasure that we are able to chronicle an evidence of advancement on the part of our Baltimore brethren, of the most satisfactory character, and which shows a determination to progress that will not be stopped by trifling obstacles. It is something new to see a Pharmaceutical Journal wholly made up of original contributions by the members of a society. Its tone is dignified, the articles are generally well written, and were all read at meetings of the College previously to their publication. Several of these articles have been transferred to this number, and the "Journal and Transactions" has been placed on our list of exchanges.

Constitution and By-Laws of the St. Louis Pharmaceutical Association. Reorganized Dec. 9th, 1857.

The receipt of the above pamphlet is acknowledged. By it we learn that the officers of the Society for 1858 are the following:—*President,* James O'Gallagher; *Vice Presidents,* Theodore Kalb and Henry Reynolds; *Recording Secretary,* Eugene L. Massot; *Corresponding Secretary,* Alexander Leitch; *Treasurer,* Wm. H. Dornin; *Executive Committee,* Joseph Murphy, Wm. B. Parker, Thomas Scott, Enno Saunders, A. Godron; *Committee on the Progress of Pharmacy,* Enno Saunders, Joseph Murphy, Theodore Kalb, James O'Gallagher, Alexander Leitch; *Committee on Unofficinal Formula,* Henry Reynolds, Eugene L. Massot, Thomas Scott, Charles Bang, Alex. Leitch.

We observed no mention of Delegates to attend the meeting at Washington, but presume they have been appointed.

Proceedings of the Academy of Natural Sciences, from January to May inclusive, 1858, has been received, and the "Proceedings" have been placed on our exchange list.